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(25,567)

20192

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, 1916.

No. 736.

CITY AND COUNTY OF DENVER ET AL., APPELLANTS,

vs.

THE DENVER UNION WATER COMPANY.

No. 737.

THE DENVER UNION WATER COMPANY, APPELLANT,

vs.

CITY AND COUNTY OF DENVER ET AL.

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1 Pleas in the District Court of the United States for the District of Colorado, Sitting at Denver.

Be It Remembered, that heretofore, and on, to-wit, the twenty-ninth day of April, A. D. 1914, came the Denver Union Water Company by Gerald Hughes, Esquire, and Clayton C. Dorsey, Esquire, its solicitors, and filed in said court, its bill of complaint; and sued out of and under the seal of said court a subpœna in chancery against The City and County of Denver, J. M. Perkins, Clair J. Pitcher, Alexander Nisbet, John B. Hunter and Otto F. Thum, as Commissioners, members and constituting the Council, of the City and County of Denver; J. M. Perkins, as Mayor and Commissioner of Social Welfare of the City and County of Denver; Clair J. Pitcher, as Commissioner of Finance of the City and County of Denver; Alexander Nisbet as Commissioner of Safety of the City and County of Denver; John B. Hunter, as Commissioner of Improvements of the City and County of Denver; Otto F. Thum, as Commissioner of Property of the City and County of Denver; James F. Markey, as Auditor of the City and County of Denver; Armour C. Anderson, Edwin Van Cise and A. Lincoln Fellows, as members of and constituting the Public Utilities Commission of the City and County of Denver.

2 And the said bill of complaint is in words and figures as follows, to-wit:

In the District Court of the United States within and for the District of Colorado.

In Equity. No. —.

THE DENVER UNION WATER COMPANY, a Corporation, Complainant,

vs.

THE CITY AND COUNTY OF DENVER, a Corporation; J. M. PERKINS, Clair J. Pitcher, Alexander Nisbet, John B. Hunter and Otto F. Thum, as Commissioners, Members of and Constituting the Council of the City and County of Denver; J. M. Perkins, as Mayor and Commissioner of Social Welfare of the City and County of Denver; Clair J. Pitcher, as Commissioner of Finance of the City and County of Denver; Alexander Nisbet, as Commissioner of Safety of the City and County of Denver; John B. Hunter, as Commissioner of Improvements of the City and County of Denver; Otto F. Thum, as Commissioner of Property of the City and County of Denver, James F. Markey, as Auditor of the City and County of Denver; Armour C. Anderson, Edwin Van Cise and A. Lincoln Fellows, as members of and constituting the Public Utilities Commission of the City and County of Denver, Defendants.

Bill of Complaint.

3 To the Honorable the Judges of the District Court of the United States for the District of Colorado:

The Denver Union Water Company, a corporation, as hereinafter stated, brings and files this bill of complaint against the city and

county of Denver, a municipal corporation; J. M. Perkins, Clair J. Pitcher, Alexander Nisbet, John B. Hunter and Otto F. Thum, as Commissioners, members of and constituting the council, of the City and County of Denver; J. M. Perkins, as Mayor and Commissioner of Social Welfare of the city and county of Denver; Clair J. Pitcher, as Commissioner of Finance of the city and county of Denver; Alexander Nisbet, as Commissioner of Safety of the city and county of Denver; John B. Hunter, as Commissioner of Improvements of the city and county of Denver; Otto F. Thum, as Commissioner of Property of the city and county of Denver; James F. Markey, as Auditor of the city and county of Denver; Armour C. Anderson, Edwin Van Cise, and A. Lincoln Fellows, as members of and constituting the Public Utilities Commission of the City and County of Denver; and complains and avers as follows:

First. Complainant is and was at all the times hereinafter mentioned, since October 18th, 1894, a corporation duly incorporated, organized and existing and doing business under and by virtue of the laws of the State of Colorado, and having its principal
4 office and place of business in the city and county of Denver, in said state; that in, by and under its articles of incorporation, and by virtue of full compliance with the laws of the state of Colorado in such case made and provided, it is now, and ever since said date has been, authorized and empowered by the State of Colorado to acquire, construct, extend, own, maintain and operate, water works for and engage in the business of supplying water to the city and county of Denver, and its included municipalities and territories, and all of the inhabitants thereof, for all uses and purposes, and to take tolls and rates therefor; and to acquire, own, maintain and operate such property as may be necessary or convenient for said purposes, and in the prosecution of such business to place, maintain and operate in the roads, streets, alleys and public places of the city and county of Denver and elsewhere, its pipes, mains, conduits and other apparatus constituting its plants or system for the supplying of water to and in said city and county of Denver.

Second. The defendants, the city and county of Denver, a municipal corporation existing under and by virtue of Article XX of the Constitution of the State of Colorado, J. M. Perkins, Clair J. Pitcher, Alexander Nisbet, John B. Hunter and Otto F. Thum, as Commissioners, members of and constituting the Council of the city and county of Denver; J. M. Perkins, as Mayor and Com-
5 missioner of Social Welfare of the city and county of Denver; Clair J. Pitcher, as Commissioner of Finance of the city and county of Denver; Alexander Nisbet, as Commissioner of Safety of the city and county of Denver; John B. Hunter, as Commissioner of Improvements of the city and county of Denver; Otto F. Thum, as Commissioner of Property of the city and county of Denver; James F. Markey, as Auditor of the city and county of Denver; Armour C. Anderson, Edwin Van Cise and A. Lincoln Fellows, as members of and constituting the Public Utilities Commission of the city and county of Denver; are each and all of them residents and citizens

of the city and county of Denver, having their principal offices and places of business in the city and county of Denver, in said state of Colorado.

Third. This is a suit of a civil nature in equity arising under the Constitution and laws of the United States, to-wit: Those provisions of the Constitution of the United States and amendments thereto, hereinafter specifically mentioned and referred to, and the matter in dispute exceeds exclusive of interest and costs, the sum of five thousand dollars ($5,000.00).

Fourth. The Denver Union Water Company was incorporated and organized under the laws of the state of Colorado on October 18th, 1894, with an authorized capital stock of seven million, five hundred thousand dollars ($7,500,000.00), divided into five
6 million dollars ($5,000,000.00) par value, of common stock, and two million five hundred thousand dollars ($2,500.-000.00) par value, of preferred stock, all of which stock was on the organization of said Company issued in part payment for property then acquired by complainant, and is now, and at all times since said original issuance has been, issued and outstanding. At the time of its organization The Denver Union Water Company became the successor in interest of and the owner and possessor of, all of the property theretofore belonging to The Citizens Water Company, The Beaver Brook Water Company, The Mountain Water Company, The American Water Works Company of New Jersey, The Denver City Water Works Company, The Domestic Water Company, The Denver Water Company, The Denver City Irrigation and Water Company, and The Denver City Water Company, and now is the owner of such property, together with the additions, extensions, betterments and improvements which have from time to time been acquired or constructed and added thereto. The companies above mentioned in this paragraph whose property The Denver Union Water Company acquired constituted all of the various companies which had furnished water to the city and county of Denver and its inhabitants from 1870 to the date of the organization of The Denver Union Water Company. The property above de-
7 scribed, now owned by The Denver Union Water Company, constitutes, and at the time of its acquirement, and ever since has, constituted all of the property used in the supplying of the city and county of Denver and the inhabitants thereof with water.

Complainant on October 20th, 1894, executed and delivered to Continental Trust Company of the city of New York, as Trustee, its certain mortgage or deed of trust, securing a bond issue of eight million dollars ($8,000,000.00), bearing interest at the rate of five per cent (5%) per annum, and maturing July 1, 1914, which said mortgage or deed of trust was recorded in the records of the office of the Clerk and Recorder of the city and county of Denver, then the county of Arapahoe, on the 1st day of November, A. D. 1894, in book 1023, at page 28, and thereafter, in accordance with the terms of said mortgage all of said eight million dollars ($8,000,-000.00) of bonds were duly issued, and ever since have been and are now outstanding in the hands of bona fide purchasers for value.

Since the date of the execution of said mortgage the New York Trust Company has succeeded the said Continental Trust Company as Trustee under said mortgage.

Since the organization of complainant in 1894 the complain-t has paid and distributed to its stockholders, the following dividends and no others:

8

Year.	Dividend.
1894	0%
1895	0%
1896	0%
1897	0%
1898	0%
1899	0%
1900	0%
1901	0%
1902	0%
1903	0%
1904	0%
1905	5%
1906	5%
1907	5%
1908	0%
1909	0%
1910	0%
1911	0%
1912	0%
1913	0%
1914	0%
Total	15%

With the exception of the dividends paid and distributed to stockholders of complainant in the years 1905, 1906 and 1907, all of the net earnings and surplus of complainant earned and accumulated during its existence have been used and devoted to the purchasing and acquiring of additional property, to the extension, improvement and betterment of the properties and water system owned by complainant and used for supplying the city and county of Denver and its inhabitants with water, and for the protection and preservation of said properties and the business of complainant.

Fifth. Defendant, the city and county of Denver, is a municipal corporation existing under and by virtue of Article XX of the Constitution of the state of Colorado, and now has, and since February 14th, 1913, has had, a charter which provides what is com-

9 monly called a "Commission Form of Government" for the city and county of Denver, under which the powers and duties of the legislative, executive and administrative departments are vested in five commissioners. The defendants, J. M. Perkins, Clair J. Pitcher, Alexander Nisbet, John B. Hunter and Otto F. Thum, are the duly elected, qualified and acting Commissioners of the city and county of Denver, each being a member of, and together con-

stituting the Council of the city and county of Denver. J. M. Perkins is the duly elected, qualified and acting Commissioner of Social Welfare of the city and county of Denver, and also Mayor thereof; Clair J. Pitcher is the duly elected, qualified and acting Commissioner of Finance of the city and county of Denver; Alexander Nisbet is the duly elected, qualified and acting Commissioner of Safety of the city and county of Denver; John B. Hunter is the duly elected, qualified and acting Commissioner of Improvements of the city and county of Denver; Otto F. Thum is the duly elected, qualified and acting Commissioner of Property of the city and county of Denver; James F. Markey is the duly elected, qualified and acting Auditor of the city and county of Denver; Armour C. Anderson, Edwin Van Cise and A. Lincoln Fellows claim to be and are acting as the duly elected and qualified members of the Public Utilities Commission of the city and county of Denver. The Public Utilities Com-
10 mission and the members thereof, as above alleged, derive their power from and are now acting under Section 264-A of the Charter of the city and county of Denver as adopted on May 17th, 1910.

Under Article XX of the Constitution of the State of Colorado, the defendant, the city and county of Denver, is the legal successor of the City of Denver, and the towns of Barnum, Colfax, Harmon, Highlands, South Denver, Argo, Berkeley, Elyria, Globeville, Montclair and Valverde, and embraces within its exterior boundaries all of the territory theretofore embraced in each and all of said predecessor municipalities, and includes approximately 37,920 acres.

Sixth. In 1870 The Denver City Water Company began the construction of a waterworks system to supply the city of Denver and its inhabitants with water. Prior to the organization of The Denver Union Water Company in 1894 and the acquirement by it of the properties of its grantor companies, as set forth in Paragraph Fourth of this bill, said grantor, and predecessor companies had constructed water systems for supplying the different municipalities which were afterwards consolidated into the city and county of Denver. Upon the organization of complainant, The Denver Union Water Company, in 1894, when it acquired all of the properties and water sys-
tems of its grantor companies, it united said properties and
11 systems into one system, which since said time has been operated as a unit and has been and is now the sole and only source of water supply for all purposes for the city and county of Denver and its inhabitants.

In 1870 the City of Denver, according to the United States census of that year, had a population of 4,759 persons, which population has constantly increased since that time, as shown by the United States census, so that in 1880 the population was 35,629; in 1890, 106,713; in 1900, 133,859; in 1910, 213,381. The commercial, financial and material growth of the said City of Denver has at all times increased correspondingly to its increase in population, and the demands on the complainant and its grantor companies likewise correspondingly increased in connection with the supplying of water to the defendant the city and county of Denver, its predecessor municipalities and the inhabitants thereof, for all purposes. In order

to meet the increased requirements of the defendant the city and county of Denver, and its predecessor municipalities, the complainant and its grantor companies, have from time to time from 1870 to date added to their properties, expanded their water systems and expended large sums of money in connection therewith.

At the present time and for some years last past the properties of the complainant constitute a complete and efficient water
12 supply system for the city. It embraces every element of structure and equipment found in any water system together with many additional important elements necessitated by peculiar local conditions found only in semi arid regions, and the water supply is obtained under different conditions than apply in any large city in the country.

For more than forty years the complainant or its grantors have been acquiring by appropriation and purchase the early water rights above Denver that can be advantageously used for a water supply for the city. They have constructed huge storage reservoirs capable of impounding sufficient water to meet the present requirements of the city, and any reasonable immediate growth, without replenishing or without aid from any other source.

Through these operations they have developed a water supply ample for all the needs and requirements of the city and county of Denver and its inhabitants, with rights perfected for use all the year around instead of for the crop growing season as is the case of irrigation rights and of such magnitude as to control during a considerable portion of every year all of the water flowing in the streams above Denver in the non-irrigating season. Because of the fact that it is impossible to obtain at any one place on any one stream above Denver a water supply adequate for its means, the supply of the com-
13 plainant is diverted at six separate and distinct locations on the South Platte River, Bear Creek and Cherry Creek at distances ranging from three to forty-eight miles from the city.

The principal physical properties of the water system consists of the following important items:

First. Eleven storage sedimentation and distribution reservoirs with controlling equipment and machinery, having an aggregate capacity of thirty-three billion gallons.

Second. Two reservoir sites partly constructed and which, when completed, will have an aggregate capacity of more than ten billion gallons.

Third. Six separate and distinct diversion systems with dams, headgates, galleries, cribs and other equipment.

Fourth. Three large and efficient filtration plants having an aggregate capacity of 65 million gallons daily.

Fifth. 532.45 miles of distributing mains and conduits ranging from four inches to sixty inches in diameter, with valves, fire hydrants and other necessary equipment, including seven large conduits ranging from three and one-half miles to twenty-two miles in length, and thirty inches to sixty inches in diameter, used to bring, by gravity, water from the reservoirs and filtration plants to the dis-

tribution system. More than forty per cent. of the total mileage of pipes and conduits is twelve inches or larger in diameter.

14 Sixth. Six large pumping stations having an aggregate capacity of sixty four million gallons daily.

Seventh. More than thirteen thousand acres of land used and necessary in connection with the control of water rights, protection of water supply and location of plant structures.

The above description is not complete or detailed, and is intended only to show the general extent and character of complainant's property.

Defendant, the city and county of Denver, is located in a semi arid region, at the eastern base of the Rocky Mountains, and dependent entirely for its water supply upon the small mountain streams which flow through or near it. The entire agricultural region surrounding and adjacent to defendant the city and county of Denver, is likewise dependent upon the water from said mountain streams for the irrigation thereof and in connection with the raising of crops thereon. As the population of defendant, the city and county of Denver has increased, and also the population of the surrounding and adjacent country, the demand for water has correspondingly increased until all of the available water has, for some years last past, been appropriated and is being used for domestic and irrigation purposes. Defendant, the city and county of Denver, has

15 not now, and never had, any source of water supply for itself and its inhabitants, or any water system or property for the distribution thereof.

Seventh. Since the formation of the complaint in 1894 all of its property acquired from its grantor companies, together with all additions, extensions, betterments and improvements thereto, has been devoted to the necessary and actual use of supplying the defendant the city and county of Denver and its inhabitants with water for all purposes, and the complainant has constantly and from time to time added to its properties and its water system and plant as the needs of the defendant the city and county of Denver and its inhabitants manifested themselves.

Complainant acquired from The Denver Water Company a certain franchise, known as Ordinance No. 44 of 1890, by some of the terms of which said The Denver Water Company and its assigns were entitled to occupy all of the streets and public ways of said City of Denver, and to supply said City of Denver and its inhabitants with water, and to charge therefor a certain schedule of rates, which said schedule of rates was in said ordinance and has always been identified as "Schedule A," and under which ordinance No. 44 of 1890 complainant supplied water to the city and county of Denver and its inhabitants until April 10th, 1910, and until in a suit in the Circuit

16 Court of the United States within and for the district of Colorado, entitled, "The New York Trust Company, a corporation, complainant, vs. The City and County of Denver, a municipal corporation, et al., defendants, in Equity, No. 5572," certain rights and privileges of complainant thereunder were held to have terminated.

Eighth. Schedule "A" has at all times been the basis of the schedule of rates charged by complainant, but from time to time the charges and rates and terms thereunder have been modified, reduced and made more favorable to defendant, the city and county of Denver, and in 1895 a horizontal reduction was made in the items contained in said Schedule "A", which resulted in a new schedule, following in items said Schedule "A", known as the "Leaflet Schedule", which is as follows:

The Denver Union Water Company.

Schedule of Semi-Annual Water Rates.

Payable in advance on the first days of May and November in each year, at the office of the Company, 501 17th, Cor. of Glenarm St.

To take effect November 1, 1895.

Alcohol, each barrel manufactured		$.04
Ale cellar	$8.00 to	16.00
Bakery, each oven	4.00 to	20.00
Barber shop, first chair		3.20
Barber shop, each additional chair		1.20
Barber baths, each		6.00
Bath, in private house, with heating apparatus:		
First bath tub		2.00
Each additional tub		1.20
17 Bath, private house, without heating apparatus		$.80
Bath, in boarding or tenement house of 15 rooms or less		2.00
Bath, in boarding or tenement house of over 15 rooms		4.00
Bath, public, hotel, saloon, sporting house, restaurant or club house, not less than		4.00
Beer, each barrel brewed		.04
Beer house	8.00 to	16.00
Beer pump, not less than		4.00
Billard tables, each		1.20
Boarding or tenement house, per room		.60
But no license less than		4.00
Book bindery not less than		4.00
Bowling alley, not less than		4.00
Bottling works	10.00 to	16.00
Brick work, per 1,000 kiln count		.08
Brick yard, each gang of hands		8.00
Camphene, each barrel manufactured		.04
Candle manufactory	20.00 to	200.00
Candy manufactory	4.00 to	30.00
Church	2.00 to	6.00
Church, Baptist for baptistry	2.00 to	6.00
Cigar manufactory, per hand		.08
But no license less than		4.00
Club room	12.00 to	40.00

Coffee saloon	6.00 to	12.00
Confectionery	6.00 to	24.00
Concrete, per cubic yard		.08
Concrete, per cubic yard, street paving		.06
Cow		.40
Cows, over five head, each		.30
Distillery, each barrel distilled		.04
Dram shop or saloon	$10.00 to	$30.00
Dyeing and scouring	10.00 to	30.00
Forge		1.20
Fountain, for six months, running not more than four hours per day:		
1 opening 1–16 inch diameter		12.00
1 opening 1–8 inch diameter		20.00
1 opening 3–16 inch diameter		32.00
1 opening 1–4 inch diameter		40.00
1 opening 5–16 inch diameter		48.00
1 opening 3–8 inch diameter		60.00
1 opening 7–16 inch diameter		72.00
1 opening 1–2 inch diameter		96.00
Fountain, vegetable	6.00 to	10.00
Fountain, fish	20.00 to	32.00
Fountain in drug store, opening not to exceed 1–8 inch in diameter		32.00
Hall	2.00 to	12.00
Hat manufactory	6.00 to	30.00
Horse, in private stable		1.20
Hose, for livery or sale stable, not less than		16.00
Hose, for livery stables:		
Not over 25 single stalls		16.00
Over 25 and up to 40 single stalls		20.00
Over 40 and up to 50 single stalls		30.00
Over 50 single stalls		40.00
Hotel, per room		.60
Ice cream saloon	6.00 to	16.00
Laboratory	8.00 to	40.00
Laundry	8.00 to	120.00
Laundry Chinese, not less than		10.00
Livery stable, per stall		.80
Lunch, in saloons	6.00 to	12.00
Malting, per 100 bushels		.80
Motor for church organ	10.00 to	16.00
Office and banks	2.00 to	12.00
Oyster saloon	6.00 to	12.00
18 Packing house	$16.00 to	$200.00
Photograph gallery	8.00 to	16.00
Plastering, per 100 square yards		.40
Porter cellar	8.00 to	16.00
Rectifying whisky, per 100 barrels		2.40
Residence, occupied by one family only:		

1 to 4 rooms		2.00
5 or 6 rooms		2.40
7 or 8 rooms		2.80
9 or 10 rooms		3.20
11 or 12 rooms		3.60
13 or 14 rooms		4.00
15 or 16 rooms		4.40
17 or 18 rooms		4.80
19 or 20 rooms		5.20
Residence used as boarding or tenement house of 10 or more rooms, per room		.60
Residence used as boarding or tenement house of less than 10 rooms		4.00
Rooms in blocks or over business houses		.60
Restaurant	$10.00 to	40.00
Sale stable, per stall		.80
But no license less than		16.00
School, including all uses of water except for boilers, motors and irrigation, for every scholar		.06
Store rooms and shops	2.00 to	120.00
Store rooms and shops:		
12½ feet front or less		2.00
Over 12½ feet front to 18 feet front		3.20
Over 18 feet front to 25 feet front		4.80
Over 25 feet front to 37½ feet front		6.00
Over 37½ feet front to 50 feet front		8.00
Over 50 feet front, special rates.		
Stores:		
Confectionery store	6.00 to	16.00
Drug store	6.00 to	12.00
Liquor store	6.00 to	12.00
Meat store or butcher shop	6.00 to	12.00
Saloons	10.00 to	30.00
Slaughter house	10.00 to	200.00
Soap manufactory	40.00 to	300.00
Soda manufactory	16.00 to	80.00
Sprinkling and washing pavements or side walks where irrigation rates are not paid, per foot run		.08
Starch manufactory	20.00 to	80.00
Steam boilers, running 24 hours per day per square foot of fire surface		.16
But no license less than		10.00
Steam boilers, for heating buildings or tenement houses only, per square foot of fire surface		.04
But no license less than		8.00
Steam boiler, for heating private residence		4.00
Stock yard	10.00 to	200.00
Stone work, per perch		.04
Sugar refinery	120.00 to	1,200.00
Tannery, per vat		2.40
But no license less than		**10.00**

Tenement, per room		.60
But no license less than		4.00
Tobacco manufactory, per hand		.80
But no license less than		4.00
Tumbler washer in drug store		32.00
Urinal basin or trough	2.00 to	8.00
Vault, for residence		1.60
Vault, accommodating double house or more than one tenant, each tenant		1.20
Vault, for tenement or boarding house for every 15 rooms or less		2.00
Vault for bar room or saloon		2.00
Vinegar, for each barrel manufactured		.04
Washing bottles	$2.00 to	8.00
Washing barrels, per barrel		.04
Washing meat	20.00 to	200.00
Washing vehicle in private stable, not less than		2.00
Water closet, private house, first bowl		2.00
Water closet, private house, each additional bowl		1.20
Water closet, in boarding or tenement house of 15 rooms or less		2.00
Water closet, in boarding or tenement house of over 15 rooms		4.00
Water closet, in hotel, club room, restaurant, saloon, barber shop or sporting house		4.00
Water closet, for use of two or more stores or houses		4.00
Wine cellar	8.00 to	16.00

Special Rates.

Irrigation of lots, including sidewalk and trees, only through hose with nozzle not to exceed one-quarter of one inch in diameter, to be used only within the hours specified on the license and never during a fire or conflagration, 22 cents per front foot for the season. Where irrigation is used outside of property line along the side of irrigated corner lots, the frontage is counted to include one-half lot additional. No license for irrigation will be issued for less than the season rate.

Meter and Elevator Rates.

Payable Monthly.

1,000	to	15,000	gallons	per	month,	20	cents	per	1,000 gallons.
15,000	to	30,000	"	"	"	18	"	"	" "
30,000	to	60,000	"	"	"	16	"	"	" "
60,000	to	150,000	"	"	"	13	"	"	" "
150,000	to	315,000	"	"	"	12	"	"	" "
315,000	to	637,500	"	"	"	11	"	"	" "
Over		637,500	"	"	"	10	"	"	" "

Minimum meter and elevator rate for business premises $3.00 per month.

Minimum meter rate for residences, 25 cents per month.

Where water is paid for all purposes on premises, there will be no additional charge for a standpipe for fire protection.

Where the Denver Union Water Company's water is not used, a special rate will be made for such standpipes.

20 With the exception of the years 1898 to 1907, during which time rates were in effect slightly in excess of said Leaflet Schedule, except as to meter rates, as provided by a certain decree of the District Court of the state of Colorado for the Second Judicial District, entitled "The City of Denver vs. The Denver Union Water Company, No. 26251," said Leaflet Schedule has been in full force and effect, including the years 1909, 1910, 1911, 1912, and 1913.

By ordinance 44 of 1890, it was provided, in reference to charges for hydrants to be paid by the city of Denver:

"For the period of ten years from and after the first day of May, 1891, the sum of thirty-five dollars per hydrant per annum for all hydrants then set and in operation, and for the remaining period until the right of purchase shall accrue, as mentioned in section 11 thereof, the sum of twenty-five dollars per hydrant per annum for all hydrants then set and in operation. All payments by the city to be made semi-annually on the first days of May and November in each year during the period aforesaid, at the office of the city treasurer."

The charges made by complainant to, and paid by defendant, the city and county of Denver and its predecessor the City of Denver, for hydrant rental, has been as follows:

Years.	Rate per hydrant per year.
1891-1901	$35.00
1901-1910	25.00
1910-1914	22.50

But the said payments for the years 1910, 1911, 1912,
21 1913 and 1914 have been accepted by the complainant with the reservations of the right to claim an additional and reasonable rate per hydrant, which said claim has never been surrendered or waived.

Ninth. Water is a commodity having an ascertained value in the city and county of Denver and State of Colorado, daily increasing in value as the uses are increased, and it is, and for many years has been necessary that the needs of the defendant the city and county of Denver for water should be anticipated, and that such water supply should be several years in advance of the actual present need, and unless such water were acquired, held and used not only would the future growth of the city and county of Denver be impeded, but its present welfare and safety seriously affected. At certain periods of each year all of the natural flow of the streams supplying

water to the city and county of Denver are not sufficient to supply one-half of the actual daily consumption, and therefore it is and has been essential in order to supply the defendant City and its inhabitants with water and to protect their health and safety, that large storage reservoirs should be built and maintained on the head waters of such streams above Denver, all of which has heretofore been done by complainant and cannot now be duplicated upon said streams. Among other things, one of complainant's grantor
22 companies heretofore caused to be incorporated The South Platte Canal and Reservoir Company, a Colorado corporation, with a capital stock of five hundred thousand dollars ($500,000.00), and all of the capital stock of said The South Platte Canal and Reservoir Company is now and has for many years been held and owned by complainant. Said The South Platte Canal and Reservoir Company, acting under the control of complainant, by the expenditure of large sums of money obtained and furnished by and through complainant, heretofore constructed a dam and created a reservoir, known and designated as the "Cheesman Lake and Dam" on the South Fork of the South Platte River, approximately forty-eight miles distant from the city and county of Denver, and which was constructed and has been and is used and necessary to be used as a storage reservoir to impound and store water for the supplying of the defendant City and its inhabitants through the water-works system of complainant, and other purposes, which reservoir has a capacity of 25,761,407,322 gallons, and now contains said amount of water, being a sufficient amount to meet the demands of the city and county of Denver; to permit of its future growth and to protect the health and safety of said city and county of Denver and its inhabitants.

Said Cheesman lake and reservoir is located twenty-three miles distant from the nearest railway point, and all material and
23 supplies used in its construction, except sand and granite, had to be hauled in by wagon from said nearest railway point. The dam of said Cheesman lake and reservoir is constructed of solid granite masonry, laid with cement; is two hundred and thirty-six (236) feet high; one hundred and seventy-six (176) feet wide at the base, and eighteen (18) feet wide at the top; thirteen hundred and eight (1308) feet long and required eighty-three thousand (83,000) barrels of cement in its construction, and more than five years to complete. There are three outlet tunnels through the solid granite shoulders of said dam, equipped with valves and machinery for the operation thereof, and the complete control of the outflow of said reservoir. The surface area of said reservoir is eight hundred and seventy-nine (879) acres and The South Platte Canal and Reservoir Company acquired and owns eight thousand, four hundred and thirty-six (8,436) acres surrounding and adjacent to said reservoir, used and necessary to be used to protect said lake and reservoir and the water therein contained, from contamination.

Said The South Platte Canal and Reservoir Company under the direction and control of complainant, also acquired and owns a

large amount of other property, including water and water rights, filter beds, filtration plants, conduits, diversion dams and works, and other like holdings, all of which were so acquired as
24 and are an essential part of the waterworks system of complainant, and are used and necessary to be used for the water supply of the city and county of Denver and its inhabitants.

The South Platte Canal and Reservoir Company, in order to so acquire and construct said above described property and to pay therefor, authorized an issue of its bonds in the aggregate sum of four million dollars ($4,000,000.00), bearing interest at the rate of five per cent (5%) per annum from the date thereof, and running for the period of twenty (20) years from their date, to-wit, July 1st, 1903; and to secure the payment thereof made, executed and delivered to the Morton Trust Company of New York, as Trustee, its deed of trust or mortgage on all of its property, real and personal, rights and franchises, then acquired and thereafter to be acquired; and complainant agreed to and did guarantee the payment of both principal and interest of each and all of said bonds. All of said bonds have heretofore been issued and sold, and in good faith purchased, and are now outstanding in the hands of purchasers for value.

On May 1st, 1903, The South Platte Canal and Reservoir Company made and entered into an agreement of lease with complainant, wherein and whereby it leased, let and demised unto said complainant, for the period of twenty (20) years from and after July 1st, 1903, all of its property of every kind, then owned or
25 thereafter to be acquired, with the right in complainant to use and operate the same, and with the exclusive right to the use of all water belonging to said The South Platte Canal and Reservoir Company, and ever since said last named date complainant has been and now is in full possession, control and use of all of said property of The South Platte Canal and Reservoir Company, and the same is used and necessary to be used as, and constitutes an essential and integral part of the water-works system of the complainant, devoted to the supplying of water to the city and county of Denver and its inhabitants.

Under said lease complainant was obligated to operate and maintain said properties of The South Platte Canal and Reservoir Company, and to pay all operating costs, taxes, and interest on its bonds. Said lease obligations have at all times been performed and are now being performed by complainant, and the properties are operated and used as a unit with complainant's properties.

Tenth. In October, 1907, complainant, at the request of defendant, the city and county of Denver, entered into arrangements with said city and county of Denver for the appraisement of all of the property of the complainant, including the property of The South Platte Canal and Reservoir Company, and in order to carry out said arrangement defendant, the city and county of Denver,
26 caused Ordinance No. 163 of the Series of 1907 to be prepared and enacted, approved and published as an Ordinance

of said city and county of Denver, which said Ordinance No. 163 of the Series of 1907, is as follows, to-wit:

By Authority.

Ordinance No. 163. Series 1907.

Aldermanic Bill No. 110.

Introduced by Ald. Bush.

A bill for an ordinance authorizing and empowering the city and county of Denver to enter into a contract with The Denver Union Water Company, whereby said company shall agree that the city and county of Denver may purchase the property of said company under an appraisement to be made in accordance with section 11, of ordinance No. 44, of the Series of 1890, before the arrival of the time fixed therefor in said contract, and authorizing the appointment of appraisers by a committee composed of the mayor, the president of the board of supervisors and the president of the board of aldermen in accordance with the provision for an appraisement of said property in the manner provided for in said Section 11 of Ordinance No. 44, of the Series of 1890, and to determine the fair and reasonable value of the water plant of said The Denver Union Water Company, and the corporations and persons used by said The Denver Union Water Company in supplying water to the city and county of Denver and to the inhabitants of the said city and county of Denver, and prescribing the manner of executing and carrying out such contract.

Whereas, on April 10th, 1890, a contract was made and entered into between the City of Denver and The Denver Water Company, contained and set forth in Ordinance No. 44 of the Series of 1890, which was duly enacted, granting The Denver Water Company the right of laying down, continuing and maintaining water pipes, valves, hydrants and apparatus for the conveyance and distribution of water through the streets, alleys and public places of said city, for the use of said city, and the inhabitants thereof; and

Whereas, in and by said contract so contained in said ordinance, it is provided in Section 11 thereof, that:

"At the expiration of the period of twenty years from and after the date of the passage and approval of the ordinance, in case the city shall then elect so to do, the said works may be purchased by the said city, and in case the parties cannot agree, after such election, upon the price to be paid by the city for the water works of the said company, its successors and assigns, then their fair cash value shall be determined by arbitration, by five disinterested persons, none of whom shall be residents of Denver, two of them to be chosen by the City, two by the company, and the fifth by the four first chosen, and in case of failure on the part of the company to name arbitrators for the period of thirty days after the city shall have named arbi-

trators and notified the company so to do, the city may apply to any court having equity jurisdiction in the county in which the City of Denver shall then be situated for the appointment of two persons of the qualifiactions aforesaid as such arbitrators, and the court may thereupon appoint two such persons, who shall act with the same force and effect as if appointed by the company, and the decision of a majority of said board shall be final and binding upon both parties, and upon the payment, or tender of payment, by said city the said company shall convey to said city all of its property, real or personal, easements, rights and privileges and thereafter all franchises, rights and privileges which have been at any time theretofore granted said company, its successors or assigns, and which it may then possess, shall cease and be at an end."

And Whereas, The Denver Union Water Company has become the owner of the properties and franchises of the said The Denver Water Company, and is at the present time its successor in and the holder of the said contract set forth and contained in said Ordinance No. 44 of the Series of 1890, aforesaid; and,

Whereas, Section 5 of the Ordinance No. 44 of the Series of 1890, provides that:

"The rate to private consumers for water shall not be greater than now charged by the said The Denver Water Company, a schedule of which rates is hereto annexed marked Schedule A, and the said The Denver Water Company may require any consumer to furnish a meter and pay for water by meter measurement; Provided, however, That, at any time after five years from date, the city council may require said company to fix schedule rates for private consumers equivalent to the average rates prevailing in the cities of Chicago, St. Louis and Cincinnati for the same service."

And, Whereas, it has been deemed desirable that efforts should be made by and on behalf of the City and County of Denver to purchase the water plant and property owned and used by The Denver Union Water Company in supplying water to the City and County of Denver and the inhabitants thereof, in accordance with the terms and provisions of the said contract of April 10, 1890, and upon a valuation thereof fixed by disinterested appraisers selected in accordance with the terms of said contract; and,

Whereas, the Mayor of the City and County of Denver, at the request of the members of the Council of the City and County of Denver, entered upon negotiations with The Denver Union Water Company for the purpose of ascertaining whether or not said appraisement might be made and said purchase effected before the time fixed in and by the terms of said contract—the said The Denver Union Water Company waiving the right to insist that said purchase could not be made under the terms of said contract until after the expiration of the period fixed therefor in the paragraph thereof, hereinbefore quoted: and,

Whereas, a correspondence was conducted between the said Mayor of the City and County of Denver and the said The Denver Union Water Company, copies of which have been heretofore transmitted

to the Council of the City and County of Denver, and considered by said Council; and,

Whereas, said The Denver Union Water Company has an abundant supply of water at all seasons of the year for the present and future needs of the City and County of Denver and its inhabitants, but admits that from time to time additions must be made to the conduits and pipes used in conducting and distributing said supply, and that in view of the shortness of the time which will elapse before the appraisers are to be appointed under and in accordance with the terms of the contract of April 10, 1890, the said The Denver Union Water Company is unwilling to expend large sums of money in building pipes and conduit lines for use in the future and after the arrival of the time when the said City and County will have the right to purchase said plant under appraisement, in view of the existing uncertainty as to whether the City will exercise its right and option to purchase said plant at said time; and,

Whereas, as a result of said investigation, negotiations and inquiries made and conducted by the City and County of Denver, it has become apparent to said City that a delay in the appointment of said appraisers for more than two and one-half years, as provided by the terms of said contract, would be to the detriment of the City and County of Denver and its inhabitants, would produce an unsettled condition of affairs with reference to said purchase, causing financial loss to said corporation, and that it is desirable and will be of advantage to the City and County of Denver and the inhabitants thereof that there should be, as speedily as it may be had, an appraisement under said contract and a determination of whether the City will purchase the property owned and used by said The Denver Union Water Company in supplying water to the City and County of Denver and the inhabitants thereof; and,

Whereas, the City and County of Denver has obtained from said The Denver Union Water Company its consent to waive the period of time fixed and set forth in Section 11 of said contract and ordinance, and to agree to proceed in conjunction with the City and County of Denver in accordance with the terms of said contract to the appointment of said appraisers at the present time, and to permit the City and County of Denver to purchase said property upon an appraisement and in accordance with the terms and conditions of said contract and ordinance without awaiting the expiration of the period fixed therefor in and by the terms of said contract and ordinance; and,

Whereas, in connection therewith, the City and County of Denver has exacted and required of and from the said The Denver Union Water Company an agreement that the said The Denver Union Water Company will submit to the City Council of the City and County of Denver, and through it to the electors of the City and County of Denver, qualified to vote thereon, a proposition for a new contract, plainly specifying, setting forth and containing what rates for water furnished to private consumers shall be charged during said period and the rates and terms upon which it will supply to the City and County of Denver for its uses and for fire hydrant rentals

for said period of twenty years, within ninety days from and after the passage of this ordinance, said rates to be ascertained and fixed for said submission by the arbitrators selected to appraise the property of said company as hereinafter set forth; so that both of said propositions, to-wit:

1st. Shall the City and County of Denver purchase the property so owned and used by The Denver Union Water Company and such allied and auxiliary corporations, persons or associates as may hold the legal title thereto, now engaged in furnishing the City and County of Denver and its inhabitants with water at a price to be ascertained and fixed by said appraisers to be appointed in the manner provided for and with the qualifications set forth in said Section 11 of said ordinance?

2nd. Shall the people of Denver make a contract for a period of twenty years with rates for water to be furnished to the City and County of Denver, and to the private consumers of water therein, plainly, specifically and unmistakably set forth and ascertained by appraisers as hereinafter set forth? shall be submitted at the same election to the electors qualified to vote thereon.

So that the said electors of the City and County of Denver, so qualified to vote thereon, shall have the choice and opportunity of determining which of said propositions they may desire to accept; and the said City and County of Denver having also obtained from said The Denver Union Water Company the assurance and agreement that it will agree with the said the City and County of Denver to put in force an arrangement and agreement fixing temporary rates to be paid said The Denver Union Water Company by the private consumers of the City and County of Denver, to be charged and collected from and after the first day of November, A. D.
27 1907, and for the remainder of the term of the present contract, in the event that the City and County of Denver shall not, at said election hereinabove referred to, determine to purchase said plant or to extend or renew said contract for a further period of twenty years; and,

Whereas, it is the judgment of the Council of the City and County of Denver, under the circumstances above narrated, that it is advantageous to said City to proceed forthwith to an acceptance of said agreement of the said The Denver Union Water Company and to the appointment of appraisers as provided in Section 11 of said contract of April 10, 1890, and to accept the proposition of said The Denver Union Water Company to waive the time limit therein specified, and that in this determination and conclusion the City Council of the City and County of Denver is fortified by the fact that the contracts between The Denver Union Water Company and certain municipalities now incorporated in and made a part of the City and County of Denver require adjustment, the former town of Highlands and the former town of Globeville, now both embraced within the limits of the City and County of Denver;

Now, Therefore,

Be it Enacted by the Council of the City and County of Denver:

Section 1. In consideration of the premises and the mutual cov-

enants and agreements hereinafter set forth and in further consideration of Five ($5.00) Dollars in hand paid by the Denver Union Water Company to the City and County of Denver, the receipt whereof is hereby acknowledged and confessed, the City and County of Denver, party of the first part, and the said The Denver Union Water Company, a corporation organized and existing under the laws of the State of Colorado, party of the second part, hereby mutually covenant and agree to and with each other as follows, to-wit:

1. It is hereby agreed that five (5) disinterested persons, none of whom shall be residents of the City and County of Denver, shall be appointed to appraise the value of the plant and property of the said Company, two of them to be chosen by the City and County of Denver through a committee herein named and authorized to make such selection, two by The Denver Union Water Company, and the fifth by the four first chosen as herein provided, the said appraisers to be selected by the City and County of Denver, to be named by said committee composed of the Mayor of the said City and County of Dener, the President of the Board of Supervisors and the President of the Board of Aldermen of the City and County of Denver; and said Mayor, President of the Board of Supervisors and President of the Board of Aldermen are hereby authorized to make said appointments, and in the event that all three may not agree, then two thereof are hereby authorized and empowered to select such appraisers and to take such steps and legal action as may be necessary for that purpose; said selection or said appointment of said appraisers by The Denver Union Water Company and the City and County of Denver in the manner herein provided, to be made within thirty (30) days after the execution of this contract, and that the fifth of said appraisers shall be selected by the first four members selected as herein provided, within thirty (30) days after the appointment of said four appraisers.

2. It is further hereby agreed and provided that such appraisers and arbitrators, so selected as herein provided, after their selection and appointment and before proceeding to hear or determine the matters submitted to them, shall take and subscribe an oath before some person duly authorized by law to administer oaths, to the effect severally that they will well, truly and impartially discharge their duty as such appraisers and arbitrators and all the matters and things submitted to them under this agreement to the best of their ability.

3. It is further hereby agreed and provided that the decision of any three of said appraisers shall be binding as to the questions submitted to them for determination under this agreement.

4. It is further hereby agreed that said appraisers and arbitrators shall view the premises and examine the property affected by and to be appraised under this agreement and shall hear such evidence and make such inquiries with reference thereto as may enable them properly to understand their duty, and after having so done and having heard such matters as shall be brought to their attention by the parties hereto, respectfully, and such other evidence as

they may determine to consider affecting the value of the premises and property belonging to or used by The Denver Union Water Company, or any of its allied and auxiliary corporations or associations or persons connected with it, engaged in or assisting in the business of supplying the City and County of Denver and its inhabitants with water, and after hearing arguments by the respective representatives of the parties hereto, relating thereto and after due consideration of the same, shall determine and fix the fair cash value of the property, business and rights so owned or used by The Denver Union Water Company, party of the second part, its allied and auxiliary corporations and associations and persons connected with it aforesaid, by which said company at the present time supplies water to the said City and County of Denver, party of the first part, and its inhabitants, or to anyone else at any place whatever, for domestic, manufacturing, or irrigating purposes and which shall constitute and include all the property, rights and privileges of every kind and nature whatsoever acquired by said party of the second part from its predecessor, The Denver Water Company, or from any person or corporation whatsoever, whether the legal title be held by said The Denver Union Water Company or by some other person; and also all property, real or personal, easements, rights and privileges and contracts of every and all nature and kind whatsoever acquired by said party of the second part, its allied and auxiliary corporations or associations or persons connected with it, since their respective incorporations, which are in any way connected with or relate to said water plant of said The Denver Union Water Company, or held by its allied or auxiliary corporations or associations or persons connected with it, or necessary or useful for its protection, maintenance and operation; and also separately ascertain the fair cash value of all that portion of said pipes, pumps, hydrants, mains and valves now used by The Denver Union Water Company, party of the second part, its allied and auxiliary corporations or associations and persons connected with it, owned by the City and County of Denver, party of the first part.

5. It is further hereby agreed that upon the appointment of said appraisers and arbitrators as so provided, they shall with all convenient speed and dispatch proceed to the hearing and determination of the matters set forth in Section 4 hereof, and shall thereupon make a full and complete report of their determination in writing, signed by said appraisers, or in the event their determinations are not unanimous, by a majority thereof, one copy to be submitted to the Mayor and Council of the City and County of Denver, party of the first part, and one copy to The Denver Union Water Company, party of the second part; and thereafter and as soon as may be by proper procedure in accordance with law, there shall be submitted to the electors of the City and County of Denver to vote thereon, the question of whether the City and County of Denver shall purchase of The Denver Union Water Company, its allied and auxiliary corporations and associations and persons connected with it, their successors or assigns, the property referred to and described in Section 4 hereof, at and for the price fixed by said Board of Ap-

praisers and Arbitrators proceeding as aforesaid, and also at the same time, to the electors qualified to vote thereon, the question as to whether a contract or franchise shall be granted to The Denver Union Water Company, party of the second part, its successors and assigns, to supply water to the City and County of Denver and its inhabitants upon the schedule, terms and conditions and for the rates set forth in a proposition to be made by the said The Denver Union Water Company, party of the second part, as provided herein, with rates in said contract to be definitely fixed and easily and plainly understood, and to be ascertained and fixed by said Arbitrators herein provided for, and which shall be fair, just and reasonable rates for the water supplied and services performed and give to said Company fair, just and reasonable returns upon a fair and reasonable valuation of its property, and to cover a period of twenty (20) years from and after the date of said election; and it is further distinctly understood and agreed that The Denver Union Water Company, in said proposal for a new contract for said period of twenty (20) years, agrees to provide for the purchase for cash from the City and County of Denver of all the mains, pipes, pumps, hydrants and valves now used by the said The Denver Union Water Company, its allied or auxiliary corporations or associations, in furnishing the City and County of Denver, or its inhabitants with water, and which is now owned by said City and County of Denver, at and for the price to be fixed thereon by the appraisers and arbitrators herein provided for and who are to appraise and determine the value of said property for said purpose.

6. It is hereby further agreed that if at such election so to be held as herein provided, the electors qualified to vote thereon shall refuse to accept the proposition of the said party of the first part for a new contract with rates therein specified as herein provided, and the qualified electors to vote thereon shall accept the said proposition with reference to the purchase of said plant and property at the valuation fixed by said appraisers and arbitrators as herein provided, then the said The Denver Union Water Company, party of the second part, hereby convenants and agrees that it will upon the payment of the price so fixed by said appraisers, either in money or in the bonds of the City and County of Denver lawfully issued therefor bearing interest at the rate of four (4 per cent) per cent. per annum, convey, transfer and deliver to said City and County of Denver all of its said water plant and property, real and personal, with all the easements, rights and privileges, and all the property, real or personal, easements, rights and privileges of whatever kind or nature, belonging to its allied and auxiliary corporations and associations or persons connected with it, used in connection with the business of supplying water to the City and County of Denver and its inhabitants, and being the said property referred to in Section 4 hereof; and that from and after said transfer and the payment and delivery thereof to The Denver Union Water Company of said price therefor in cash or in said bonds of the City and County of Denver, as herein provided, all franchises, rights and privileges which have at any time theretofore been granted to the said The

Denver Union Water Company or its successors and assigns by the City and County of Denver, or any of its component municipalities, or which have been transferred to said The Denver Union Water Company, or to any of its successors and assigns, and its allied and auxiliary corporations or associations, and which it shall then possess, shall then be at an end without further action or determination of the same.

7. It is further hereby agreed that if at said election so to be held as herein provided, the electors qualified to vote upon said proposition shall refuse by their majority vote to accept the proposition of said The Denver Union Water Company and its allied and auxiliary corporations or associations, to purchase said water plant, but shall vote to grant a new contract to The Denver Union Water Company, specifying the rates therein to be charged in the manner herein provided, then said party of the second part, its successors and assigns, shall receive from the City and County of Denver a franchise or contract containing the terms provided for therein for a
28 period of twenty (20) years from the date of said election.

8. It is further hereby agreed that if at said election as herein provided, and which it is understood and agreed and is provided hereby shall be a special election called for considering said two propositions, the electors qualified to vote thereon shall, by their majority vote, refuse to accept either the proposition as to the purchase of said property or as to the granting of a new contract, the action of the said parties hereto in entering into this agreement and in submitting said matters to the vote of the electors qualified to vote thereon as herein provided, shall not constitute a waiver of the rights or privileges of either party hereto or prejudice in any manner or form or to any extent whatever the rights and privileges of the City and County of Denver, party of the first part, or The Denver Union Water Company, party of the second part, under and by virtue of the provisions, or any of them, of the said contract of April 10, 1890, being said Ordinance No. 44 of the Series of 1890, all the rights, privileges and franchises of either party hereunto provided for or contained in and by the terms of said contract and ordinance shall be and remain in full force and effect the same as if this contract and agreement had not been entered into and *and* said fifth appraiser so appointed for had been taken.

9. It is further hereby agreed that in case either of the parties named as appraisers and arbitrators by the party of the first part shall die, fail or refuse *to* become unable to act as such appraiser and arbitrator before the final determination of the matters herein involved, then the Mayor of the City and County of Denver is hereby authorized to forthwith thereafter name and appoint some other person, having the qualifications hereinbefore set forth, to be an appraiser and arbitrator in the stead and place of the one before appointed and unable and failing to act as herein provided; and so, in like manner, in case of either of the persons appointed as appraisers and arbitrators by the party of the second part shall die or refuse or become unable to act as such appraiser and arbitrator before the matters herein referred to are settled and the appraisement and arbi-

tration shall be determined, then the party of the second part is hereby authorized and empowered in the same manner as in the first instance to forthwith thereafter appoint some person, having the qualifications hereinbefore set forth, to act in the place and stead of the one theretofore appointed but being unable to act; and so, in like manner, in case the person appointed by the four other appraisers, as the fifth appraiser, shall die or refuse or fail or become unable to act as appraiser and arbitrator as herein provided, before all the matters referred to above are determined, then the four persons then acting as arbitrators and appraisers shall forthwith thereafter appoint a person having the qualifications aforesaid, as appraiser and arbitrator in the place and stead of the one theretofore appointed and whose death, failure or refusal to act has prevented him from participating in such appraisement, and said fifth appraiser so appointed shall have the same authority and power as was conferred upon the person theretofore appointed.

10. It is further hereby agreed that all costs and expenses incurred by reason of the appraisement, arbitration and special election hereby had and made under this agreement and under the terms and provisions of said contract, shall be borne by the parties hereto equally.

11. It is further hereby agreed that the parties hereto respectively shall produce before said appraisers and arbitrators while considering said matters, all books, deeds, papers, accounts, vouchers, writings and documents within their possession or under their control or under the control or in the possession of their allied corporations and associations or any person connected with them, which the said Board of Appraisers and Arbitrators may require, call for or request, bearing upon and properly relating to the matters submitted to said appraisers and arbitrators for consideration, and said appraisers and arbitrators may require and call for and request said matters and things from time to time as in their judgment they may deem desirable.

12. It is hereby further agreed that said appraisers and arbitrators shall be at liberty to and are hereby authorized and empowered to proceed, without the party or parties failing to attend before them, in case of the non-attendance of the parties to this agreement, or any of them, or any of the witnesses or representatives of the parties to this agreement, or any of them, or in case of the failure on the part of said parties, or either of them, to produce any books, deeds, papers, accounts, vouchers, writings, or other documents within their possession or under their control or under the control of their allied or auxiliary corporations or associations, or any person connected with them, which the said board of appraisers and arbitrators shall call for or request, after three (3) days previous notice in writing, under the hands of the members of said board given to the said parties or witnesses and their designated representatives notifying them to produce such books, deeds, vouchers, papers, accounts, writings or other documents, and of the time and place where the same are to be produced.

13. It is hereby agreed and provided that the said respective parties hereto shall each pay the appraisers named by them, and shall

share and pay equally the amount of the fifth appraiser as herein provided for.

It is hereby agreed that the said appraisers and arbitrators shall have the power if in their opinion it shall be necessary to employ an accountant to assist them, and that all other necessary aid and assistance required by said appraisers and arbitrators shall be furnished by and at the expense of the parties of the first and second parts hereto.

In Witness Whereof the party of the first part has caused these presents to be signed by its Mayor, attested by its Clerk, and its corporate seal to be hereunto affixed, and the party of the second part, being duly and legally authorized thereunto, has caused these presents to be signed by its President, attested by its Secretary, and its corporate seal to be hereunto affixed, this — day of ——, A. D. 1907.

Section 2. The Mayor of the City and County of Denver is hereby authorized, empowered and directed to subscribe said agreement herein adopted and hereinbefore set forth in Section one (1) hereof, and the City Clerk of the City and County of Denver is hereby authorized, empowered and directed to attest such act of said Mayor and to affix to said contract the seal of the City and County of Denver, and the Auditor of the City and County of Denver is hereby authorized, empowered and directed to countersign and register said contract.

Section 3. The Mayor of said City and County of Denver, the President of the Board of Supervisors and the President of the Board of Aldermen are hereby named, constituted and appointed a committee of three and are hereby authorized, empowered and directed to name and appoint the appraisers and arbitrators provided for in said agreement and set forth in Section one (1) hereof to be appointed and named by the said the City and County of Denver.

Section 4. The Denver Union Water Company within ten days after the passage and publication of this ordinance shall sign and subscribe said contract and agreement herein recited and adopted and set forth in Section one (1) hereof, and upon its failure so to do this ordinance and contract shall become null and void.

JOHN CONLON,
President of the Board of Aldermen.
A. J. SPENGEL,
President of the Board of Supervisors.

Signed and approved by me this 2nd day of October, A. D. 1907.
R. W. SPEER, *Mayor.*

Attested by the undersigned with the corporate seal of the City and County of Denver.

[SEAL.]
E. E. SOMERS,
Clerk of the City and County of Denver.

Published in The Denver Republican this 4th day of October, A. D. 1907.

29 STATE OF COLORADO,
City and County of Denver, ss:

I, Burt F. Davis, Clerk of the City and County of Denver and State aforesaid, do hereby certify that the foregoing is a full, true and correct copy of Ordinance No. 163, series 1907, of the city of Denver, the original of which is on file and of record in my office.

Witness my hand and the seal of said City this — day of August, A. D. 1910.

—— ——,
City Clerk,
By —— ——, *Deputy.*

In and by said ordinance it was contemplated and provided that a contract in form and substance as set forth therein should forthwith be entered into between complainant and defendant the city and county of Denver, to the effect that the city and county of Denver should be and was granted the privilege of causing the appraisement contemplated by Section 11 of Ordinance No. 44 of the Series of 1890 to be forthwith made prior to April 10th, 1910; and thereafter, and within ten days after the passage and publication of said Ordinance No. 163 of the Series of 1907, complainant and defendant the city and county of Denver did make and enter into the contract in form and substance as set forth in said Ordinance No. 163 of the Series of 1907, to the effect and as contemplated
30 and provided in said ordinance.

Shortly after the passage and approval of said ordinance No. 163 of the Series of 1907 and the execution and delivery, in pursuance thereof, of said contract, and in full compliance with the terms of both said ordinance and said contract, five appraisers or arbitrators were duly appointed. All of said appraisers or arbitrators were non-residents of the city and county of Denver, wholly disinterested and impartial, and in the highest degree qualified by training and experience to perform the duties imposed upon them in connection with said appraisement.

The appraisers selected by complainant were: John R. Freeman, of Providence, Rhode Island, and C. L. Harrison, of New York City. Prior to the selection of appraisers for defendant the city and county of Denver, the Mayor of said city submitted to the various commercial bodies of said city a list of names, stating to each of said commercial bodies that the city and county of Denver had practically decided to make its selection from among the men mentioned in said list, thereby presenting the matter to the public, and requesting that if any of said organizations or any citizen knew of any good reason why any of said parties should not be appointed as appraisers for said city and county of Denver the Mayor should be advised without delay. No objection was made to any of the persons named in said list, but on the contrary, all of them received the approval of
31 said commercial bodies. Upon the list so submitted appeared the names of Frederick P. Stearns, of Boston, Massachusetts, Allen Hazen, of New York City, and M. L. Holman, of St. Louis,

Missouri. Thereafter the defendant, the city and county of Denver, appointed said Frederick P. Stearns and said M. L. Holman as its appraisers, and thereafter the four appraisers so selected by the complainant and the defendant the city and county of Denver proceeded to and did select as the fifth appraiser, contemplated in and required by the provisions of said ordinance, Allen Hazen. Each of said appraisers was of national eminence and of the highest reputation and ability, an hydraulic and civil engineer of unquestioned integrity, and by experience, ability and training, particularly in reference to any matters relating to waterworks and the supplying of water to large cities, was in the highest degree qualified in every particular to perform the duties which he assumed.

After the appointment and de-signation of said appraisers they duly qualified, in conformity with said ordinance No. 163 of the Series of 1907; and thereupon said appraisers proceeded to make an appraisement of all of the property and plant constituting the water works system of complainant, including the property of The South Platte Canal and Reservoir Company, being the system and property used and necessary to be used in supplying the defendant
32 the city and county of Denver and its inhabitants thereof with water for all purposes, and being included in the property and water system of complainant now being used in supplying the city and county of Denver and its inhabitants with water, and being the same property and system now used, except for the additions, extensions, betterments and improvements which complainant has made to its water system since the date of said appraisement, and as hereinafter more specifically set forth. Full hearings were had before said Board of Appraisers, evidence taken and arguments presented for and on behalf of both parties, towit, complainant and defendant the city and county of Denver. Personal examinations and investigations were made by said Board of Appraisers, and after the most careful, thorough, complete and impartial investigation and hearings by them covering a period of about eighteen months, and after allowing both complainant and its representatives, and the defendant the city and county of Denver and its representatives, the fullest opportunity to present any and all evidence and to be heard in respect to every point involved, the Board of Appraisers did on March 20th, 1909, find and determine and announce its findings and determination to the effect that the value of said property so devoted to the supplying and necessary to the supplying of the city and county of Denver and its inhabitants with water, as of the date of said appraisement, was the
33 sum of fourteen million, four hundred thousand dollars ($14,400,000.00), which said amount said Board of Appraisers announced should be subject to an equitable adjustment between the parties as of the date of any actual purchase and relating to changes, if any, which might have occurred since the date to which said appraisement referred, particularly in respect to the stock of material on hand, including the personal property not directly connected with the system, and which the said Appraisers announced could readily be done; and also subject to any additions and bet-

terments to the plant which might be made subject to the date of said appraisement.

A copy of said Appraiser's Report is as follows:

34 *Report of The Board of Appraisers and Arbitrators Upon the Property of The Denver Union Water Co. March* 20, 1909.

35 Report of The Board of Appraisers and Arbitrators Upon the Property of The Denver Union Water Company March 20, 1909.

36 Report of the Board of Appraisers and Arbitrators Constituted by the Terms of a Certain Agreement Between the City and County of Denver and The Denver Union Company, Dated the Tenth Day of October, A. D. 1907.

To the Honorable the Mayor and City Council of the City and County of Denver, and to The Denver Union Water Company.

The undersigned, having been duly selected and appointed as members of the Board of Appraisers and Arbitrators under and pursuant to the terms of a certain agreement between the City of Denver and The Denver Union Water Company, dated the 10th day of October, A. D. 1907, and authorized on the part of the City and County of Denver by Ordinance No. 163 of the Series of 1907, to which reference is hereby made, report as follows:

That having been each separately duly qualified pursuant to the provisions of paragraph 2, section 1 of Ordinance No. 163, of the Series of 1907, and having taken and subscribed an oath as in said paragraph prescribed, before the Honorable The Chief Justice of the Supreme Court of the State of Colorado; and,

Having, pursuant to the provisions of paragraph 4, section 1, of Ordinance No. 163, of the Series of 1907, viewed the premises and examined the property affected by and to be appraised under said agreement, and heard such evidence and made such inquiries with reference thereto as might enable us properly to understand our duty, and having so done, and having heard such matters as were brought to our attention by the parties to said contract respectively, and such other evidence as we determined to consider, affecting the value of the premises and property belonging to or used by The Denver Union Water Company, or any of its allied or auxiliary corporations or associations or persons connected with it, engaged in or assisting in the business of supplying the City and County of Denver and its inhabitants with water, and having heard arguments by the respective representatives of the parties to said contract relating thereto, and having given due consideration to the same:

First. We hereby determine and fix the fair cash value of the property, business and rights owned or used by The Denver
37 Union Water Company, party of the second part, its allied and auxiliary corporations and associations and persons con-

nected with it aforesaid, by which said company at the present time supplies water to the said City and County of Denver and its inhabitants, or to any one else, at any place whatever, for domestic, manufacturing or irrigating purposes, and which constitute and include all the property, rights and privileges of every kind and nature whatsoever acquired by The Denver Union Water Company, from its predecessor, The Denver Water Company; of from any person or corporation whatsoever, whether the legal title be held by The Denver Union Water Company or by some other person; and also all property, real or personal, easements, rights and privileges and contracts of every and all nature and kind whatsoever acquired by The Denver Union Water Company, its allied and auxiliary corporations or associations or persons connected with it since their respective incorporations, which are in any way connected with or related to the water plant of The Denver Union Water Company, or held by its allied or auxiliary corporations or associations or persons connected with it, or necessary or useful for its protection, maintenance and operation, at the sum of fourteen million, four hundred thousand dollars ($14,400,000.00).

For the information of the parties hereto, it may be stated that the total sum of $14,400,000.00 so determined and fixed as the fair cash value of the property, business, etc., above described, may be divided and distributed in the following manner:

(*a*) The physical plant, including all land and all structures, based on the fair cash value of the land and the fair and reasonable cost of reproducing the structures, including allowances for interest during construction, engineering, contingencies and general expenses, and with due deductions for the depreciation because of wear and tear, and allowances for increase or decrease in utility and value for the purposes for which they are used, the sum of ten million, three hundred fifty-four thousand, seventy five dollars ($10,354,075.00).

(*b*) Water rights owned or used by The Denver Union Water Company, the sum of two million, eight hundred forty-five thousand, nine hundred twenty-five dollars ($2,845,925.00).

(*c*) Business and going concern value, representing the added value of the plant because of its connections and business, and because the parts are united into one system and are tested and in successful use, and the value of the business during the remainder of the present franchise term, one million, two hundred thousand dollars ($1,200,000.00).

For the further information of the parties hereto, we append a schedule of the items of physical property that we have considered, including joint reports upon certain quantities and certain values that we have considered in making our award.

We further call attention to the fact that this appraisal is made and the value so fixed and determined has been arrived at, upon
38 the data and the schedules furnished to the board during its session, and the changes, if any, which have occurred in these schedules, particularly having reference to the stock of material on hand, including personal property not directly connected with the system, and including pipes, valves, wood staves, bands, cement,

shall be subject to equitable adjustment between the parties as of the date of the actual purchase, if made, and this can quite readily be done.

Second. We hereby separately ascertain, determine and fix the fair cash value of all of that portion of said mains, pipes, pumps, hydrants and valves now used by The Denver Union Water Company, its allied and auxiliary corporations or associations and persons connected with it, and owned by the City and County of Denver, at the sum of three hundred fifteen thousand dollars ($315,000.00).

A copy of this report is submitted and sent to the Mayor and City Council of the City and County of Denver, and likewise to The Denver Union Water Company; and such further reports, pursuant to the terms of said contract between the parties, and said Ordinance No. 163, of the Series of 1907, will hereafter be made as are required.

All of which is respectfully presented this, the twentieth day of March, A. D. 1909.

(Signed) M. L. HOLMAN.
JOHN R. FREEMAN
C. L. HARRISON.
ALLEN HAZEN.

I assent to all parts of the foregoing report except the valuation given therein of the water rights owned or used by The Denver Union Water Company.

(Signed) FREDERIC P. STEARNS.

39 *Schedule of Property of the Denver Union Water Company, and of the City and County of Denver, Valued by the Board of Appraisers, and Appended to Their Report of March* 20, 1909.

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A schedule of the water rights of the company	6
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40 *Papers Accompanying Report of Board Upon Valuation of the Works and Property of The Denver Union Water Company.*

List of Water Rights of The Denver Union Water Company.

The South Platte River in Water District No. 8.

1. 34.00 cubic feet per second, Platte Canon Ditch. Appropriation and decree as of December 30, 1863.

17.30 cubic feet per second, Platte Canon Ditch. Appropriation and decree as of December 30, 1864.

Both appropriations changed from an irrigation use to an all-the-year domestic use and city supply in 1889. Subject to the right of other parties to irrigate 195 acres of land. Prior appropriations out of the Platte River, 58 cubic feet per second. Total decreed appropriations from the Platte River and tributaries in Water District No. 8, 2,848 cubic feet per second.

2. 37.00 cubic feet per second, Rough and Ready Ditch and Mill Race. Appropriations as of December 31, 1860.

31.27 cubic feet per second, same December 31, 1867.

Appropriations for power purposes purchased by the Water Company to protect its Platte Canon Ditch rights.

3. 1.00 cubic foot per second in the Northern Colorado Irrigation Company's ditch, which has an appropriation of 1,184 cubic feet, as of January 18, 1879. Purchased with the land embraced in the Platte Canon Reservoir, owned by the company, and giving a claim of right for headgate in said ditch for water for said reservoir.

4. Contracts with the Northern Colorado Irrigation Company for carrying water belonging to the company—Platte Canon Ditch rights and Cheesman Lake water, and 34-inch conduit appropriation—from headgate and dam of said Northern Colorado Irrigation Company's canal to said Platte Canon reservoir.

5. 2.50 cubic feet per second for all domestic and municipal purposes. Appropriation as of December 20, 1870, by the erection of pumping plant and waterworks in the city of Denver.

6. 24.00 cubic feet per second for all domestic purposes and 6.00 cubic feet per second for municipal and all beneficial purposes other than irrigation by the erection of the pumping plant in West Denver and the Mississippi filtering beds September 10, 1878, but relating back to December 20, 1870.

41 7. 11.44 cubic feet of water per second for all domestic purposes, and 2.76 cubic feet of water per second for municipal and all other beneficial purposes other than irrigation by the construction of the 30-inch conduit or pipe line diverting water through galleries in the bed of Cherry Creek (a tributary to the South Platte River) in the northwest quarter of section 28, township 4 south, range 67 west, constructed in the spring of 1889, but relating back to December 20, 1870.

8. 9.90 cubic feet of water per second for all domestic purposes, and 2.48 cubic feet of water per second for municipal and all other beneficial purposes other than irrigation by the construction of the 30-inch conduit or pipe line diverting the underflow and surface water through galleries in the west bank of the South Platte River in the north-east quarter of section 34, township 6 south, range 67 west, in the spring of 1889, but relating back to December 20, 1870.

9. 19.80 cubic feet of water per second for all domestic purposes, and 4.95 cubic feet of water per second for municipal and all other beneficial purposes other than irrigation by the construction of the 34-inch conduit or pipe line diverting water through a headgate situate in the east bank of the South Platte River, in the northwest quarter of the northeast quarter of section 5, township 7 south, range 69 west, in the year 1892, but relating back to December 20, 1870.

10. 30.34 cubic feet of water per second for all domestic purposes, and 7.74 cubic feet of water per second for municipal and all other beneficial purposes other than irrigation by the construction of the 40-inch conduit or pipe line diverting water through headgates in the west bank of the South Platte River in the southwest quarter of section 34, township 6 south, range 69 west, in May, 1899, but relating back to December 20, 1870.

11. 278.26 cubic feet of water per second, appropriation of the Denver City Irrigation and Water Company, as of September 10, 1878, for power purposes West Denver pumping plant, Archer Lake.

12. Lake Cheesman Dam and Reservoir—Appropriation of all the unappropriated and flood waters and winter flow of the South Fork of the South Platte River above said dam for the full capacity of said reservoir and to refill the same at all times whenever and as fast as water is withdrawn or used from said reservoir for any purposes. Appropriation dating from December 28, 1889, and October 23, 1893.

Surface area of reservoir, 874.08 acres.

Capacity, 3,444,038,412 cubic feet, or 25,761,407,322 gallons above the lower tunnel.

Lake Cheesman is in Water District No. 23.

13. Bear Creek, Water District No. 9—100 shares in The Harriman Ditch Company, out of a total of 400 shares.

42 The Harriman Ditch Company is the successor of The Arnett Ditch Company and owns all of the latter's appropriations of water, viz.:

March 16, 1869	7.94 cubic feet.
May 1, 1873	25.54 cubic feet.
March 1, 1882	12.87 cubic feet.

14. 60 shares in The Soda Lakes Reservoir out of a total of 400 shares. Appropriation from Bear Creek through The Harriman Ditch Company of 120,252,689 cubic feet as of May 4, 1893.

15. 72 shares of The Bergen Ditch Company out of a total of 400 shares. Appropriation of May 1, 1874, of 12.00 cubic feet. Turkey Creek.

16. Marston Lake Reservoir—Capacity, 862,257,600 cubic feet, or 6,449,686,848 gallons. Filled and supplied by the Harriman ditch, through the above rights owned by the company in said ditch and in Soda Lakes, and by means of items Nos. 17 and 18, following:

17. Appropriation made by The Harriman Ditch Company September 21, 1892, of all the unappropriated and flood waters and winter flow of Bear Creek to fill and supply 19 reservoirs under said ditch, including Marston Lake. After this appropriation was made the ditch was greatly enlarged for the purpose of carrying this appropriation.

The ditch was enlarged at that time to a carrying capacity of 150 cubic feet per second.

18. Contract with The Harriman Ditch Company for all the surplus water carried by said ditch to fill Marston Lake.

NOTE.—The Water Company owns 100 shares of the stock of this company, as shown above, out of a total of 400 shares, and has perpetual proxies for 110 shares, in addition, making 210 under its control, so that it has absolute control of the ditch.

19. Harriman Lake—Capacity, 38,072,839 cubic feet. Reservoir Appropriation No. 1, in Water District No. 9, May 1, 1873, 18.00 cubic feet per second.

20. Water bearing lands and subterranean water. See list of real estate.

Messrs. Allen Hazen, John R. Freeman, C. L. Harrison, F. P. Stearns, M. L. Holman, Appraisers of The Denver Union Water Company's Plant and Property.

GENTLEMEN: In the list heretofore handed to you of the water rights owned by The Denver Union Water Company, the following were inadvertently omitted, to wit:

43 1. Appropriation belonging to The Harriman Ditch Company, made by its predecessor, The Arnett Ditch Company, from Turkey Creek, in Water District No. 9, being Priority No. 21, of date April 15, 1868, for 10.75 cubic feet of water per second.

2. Water right from The Northern Colorado Irrigation Company's canal for 20.64 acres to irrigate land owned by The Denver Union Water Company in the south half of the south-east quarter and the south half of the south-west quarter of section 28, township 4 south, range 67 west.

Respectfully submitted,

(Signed) W. P. MILLER, *Secretary.*

Denver, Colorado, December 17, 1907.

44 *Report of the Value of Real Estate Owned by the Denver Union Water Company in the City of Denver.*

DENVER, COLORADO, December 10, 1907.

To the Honorable Board of Appraisers:

GENTLEMEN: The undersigned, appointed respectively by the City and County of Denver and The Denver Union Water Company, at your request and under your authority, to estimate and appraise the present value of all the lands and real estate owned by said The Denver Union Water Company, situate in the City and County of Deuver, as well as certain tracts of land in Jefferson County and two separate tracts, together with the improvements thereon, situate in the Town of Littleton, Arapahoe County, Colorado, beg leave to report that, after careful examination of the several tracts and an investigation of such matters as would aid in arriving at a conservative valuation of the properties in question, the following stated values have been jointly agreed upon and fixed by us as the reasonable and fair value of the properties hereinafter described, viz.:

All of block 7, Weir Addition, on South Zuni street, between West Seventh and West Sixth avenues, on the line of The Denver, Marshall & Boulder Railroad, comprising 26 fractional lots, suitable for trackage purposes.	$1,200.00
Plats 2, 7 and 8, block 38, Eastern Capitol Hill Sub-division on Second avenue between Cherry street and Clermont street, comprising 12 regular size city lots, including 2 corners	1,350.00
NOTE.—There is an artesian well cased to a depth of 700 or 800 feet on these lots, the value of which has not been taken into consideration.	
Lots 11 and 12, block 48, Second Filing of a portion of Highland Park, on West Thirty-fifth avenue, between Boulevard F and Grove street	800.00
All of block 19, Cottage Hill, 38 lots, 4 corners; lots 1 to 32, block 20, Cottage Hill, 33 lots; lots 1 to 10, block 23, Cottage Hill, 10 lots; lots 1 to 12, block 22, Cottage Hill, 12 lots; comprising 93 lots, located on	
45 West Thirty-third and West Thirty-fourth avenues, Moncrieff place, Yates street and Sheridan boulevard	15,850.00
NOTE.—The Cottage Hill Tank of the Water Company is located on a portion of block 22, the value of which has not been appraised.	
Lots 1, 2, 3 and north 5 feet of lot 4, block 10, De Lappe place, located at the corner of West Twenty-ninth avenue and Sheridan boulevard	375.00

Lots 23 to 26, block 50, University Park, amended map, 4 lots, corner of Iliff avenue and South Harrison street			300.00
NOTE.—This is the location of the University Park Tank, the value of which has not been appraised.			
Lot 19, block 33, Witter's First Addition. This lot is located in West Eleventh avenue at the intersection of South Thirteenth street			1,000.00
Lots 4 and 19, block 6; lot 4, block 7, Titus Addition; west half of south half of south-east quarter of north-west quarter of section 4, township 4 south, range 68 west, except 50 feet off of west end of said tract conveyed to The Denver, South Park and Pacific Railway Company ...	9.25	acres	
Part of the south-east quarter of the north-west quarter, section 4, township 4 south, range 68 west	1.00	acre	
Part of the south-east quarter of the north-west quarter of section 4, township 4 south, range 68 west..	0.21	acre	43,200.00
NOTE.—The above mentioned four tracts, containing 10.80 acres, are the lands upon which are located the West Denver pumping station, reservoirs, storehouses, stables, etc., the value of some of which said improvements is included herein.			
Part of the south-east quarter of the north-east quarter, section 5, and part of the south-west quarter of the north-west quarter, section 4, township 4 south, range 68 west.....	2.85	acres	
Part of the south-west quarter of the north-west quarter, section 4, township 4 south, range 68 west	0.64	acre	
46 Part of the south-west quarter of the north-west quarter, section 4, township 4 south, range 68 west	1.90	acres	10,780.00
NOTE.—The above described 5.39 acres is land occupied by the tail-race from the West Denver pumping station.			
Part of the north-east quarter of the south-west quarter, section 4, township 4 south, range 68 west	4.03	acres	

Part of the south-west quarter of the south-east quarter, section 4, township 4 south, range 68 west	0.88	acre
Part of the south-east quarter of the south-west quarter, section 4, and of the north-east quarter of the north-west quarter, section 9, township 4 south, range 68 west	17.31	acres
Lots 1 to 5, block 1; lots 1 to 5, block 2; lots 32 to 37, block 2, Middaugh's Addition to Denver; strip of land off of the east or rear end of lots 6 to 11, block 1, and lots 1 to 20, block 8, Middaugh's Addition	1.01	acres
Part of north-east quarter of north-west quarter, section 9, township 4 south, range 68 west.....	2.00	acres
Part of west half of north-east quarter and of south-east quarter of north-west quarter, section 9, township 4 south, range 68 west	20.97	acres
Part of south-west quarter of north-east quarter, and of south-east quarter of north-west quarter, section 9, township 4 south, range 68 west..	10.20	acres
Part of north half of south-east quarter of section 9, township 4 south, range 68 west	8.34	acres
Part of south-east quarter of south-east quarter, section 9, township 4 south, range 68 west.....	5.00	acres
Part of south-east quarter of south-east quarter of section 9, township 4 south, range 68 west, except 50 feet by 100 feet in south-west corner..	8.00	acres
Part of south-east quarter of south-east quarter, section 9, and of north-west quarter of north-west quarter, section 15, and of north-east quarter of north-east quarter, section 16, township 4 south, range 68 west	16.447	acres
47 East half of south-east quarter of north-east quarter, section 16, township 4 south, range 68 west	20.00	acres
Part of west half of south-west quarter of section 15, township 4 south, range 68 west	6.06	acres

Part of north-west quarter of north-west quarter, section 22, township 4 south, range 68 west	13.31	acres	
	131.557	acres	$174,334.50

NOTE.—The above described 14 tracts of land comprises what is known as the Lake Archer Canal and Mississippi Street Galleries, and along and through which tract is laid the West Denver conduit, and the value thereof is estimated as being restored to its natural condition.

Part of south-west quarter of south-east quarter, section 11, township 4 south, range 68 west.....	5	acres	10,000.00
Alameda Avenue Tank—			
NOTE.—Improvements have not been appraised.			
Part of north-west quarter of south-east quarter, section 25, township 3 south, range 69 west	8.37	acres	7,533.00
Ashland Avenue Reservoir Site—			
NOTE.—Value of improvements has not been appraised.			
Lots 1 to 11, block 1, Resubdivision of Lakeside, Jefferson County, Colo..			1,375.00
Ashland Avenue Pump Station Site—			
NOTE.—Improvements have not been appraised.			
Lots 11 to 20, block 5; lots 28 to 40, block 6, Chamberlin's Capitol Heights			250.00
NOTE.—These lots adjoin the Capitol Hill Reservoir on the east.			
Lots 25 to 44, block 3, Littleton Heights; improvements, $5,500; real estate $4,000			9,500.00
NOTE.—This is the residence and office of the superintendent and headquarters of the river division of the water system.			
48 North-west quarter of south-west quarter of north-east quarter, section 20, township 5 south, range 68 west.....	10.00	acres	

Tract of land in section 17, township 5 south, range 68 west; improvements, $15,500; real estate, $15,200	3.50	acres	28,700.00
NOTE.—These two tracts are occupied by the mill warehouses, dam and power ditch of The Littleton Milling and Water Power Company. The value of the water power in connection with this property has not been appraised.			
Lease of the premises at 1654 Broadway, occupied by the offices of The Denver Union Water Company, expiring November 1, 1913.....			$12,000.00
Lease of the premises in rear of 1640 Broadway, occupied as a garage of The Denver Union Water Company, expiring November 19, 1908			No value
Total			$318,547.50

Lease of the north-east quarter of north-west quarter of section 1, township 4 south, range 68 west, dated February 25, 1887. Terms: "From the date hereof, so long as the said party of the second part, its successors or assigns shall furnish and supply the City of Denver, and the inhabitants thereof, with water," etc. Rental, $500.00 per annum.

Lease of a strip of land 50 feet wide along the north side of the south-east quarter of North-west quarter of south-west quarter, section 1, township 4 south, range 68 west, dated March 25, 1903. Terms: "From the day of the date hereof for during and until the first day of January, A. D. 1923." Rental, $75.00 per year.

NOTE.—The two leases last mentioned are for tracts of land, the value of which is estimated at $35,000.00, owned by the City and County of Denver, and used for the Capitol Hill Reservoir and Pumping Station. These leases are a valuable asset of the Water Company, but in view of the fact that this appraisement is being made for the purpose of a sale to the city from which the leases were obtained, we are at a loss to determine their value, and think it best to leave the matter to your board. In the event that the Water Company's properties were being sold to another corporation, or to individuals, these leases, the principal one being practically perpetual,
49 and the other for a long term, would unquestionably be of great value.

Respectfully submitted,

(Signed) VICTOR R. OLMSTED,
WM. W. WATSON.

50 *Report on the Value of Real Estate Owned by the Denver Union Water Company Outside of the City Limits.*

To the Honorable R. W. Speer, Mayor of the City of Denver, and to The Denver Union Water Company of Denver, Colorado:

GENTLEMEN: We, the undersigned, J. B. McNeil, of 512-20 Cooper Building, Denver, Colorado, appointed by the Honorable R. W. Spear, Mayor of Denver, and Burton D. Sanborn, of Greeley, Colorado, appointed by The Denver Union Water Company, as appraisers to appraise the lands of The Denver Union Water Company lying outside of the City of Denver, both with and without water rights, do hereby respectfully report that we have not considered in this report the particular water rights which The Denver Union Water Company own, it being our understanding that they own in the aggregate more than sufficient water to fully irrigate all the lands reported by us as irrigable, on which we have placed a value of water rights, and on account of the amount of water which we understand said company own, and the large amount of storage capacity under their control, we have seen fit to describe said water rights to go with irrigated lands in acre feet, and following in this report wherever we appraise land with water unless otherwise specified, we consider one and three-fourths (1¾) acre feet a full and ample supply for each acre of land, and our only concern has been that land described with water right is located under some good ditch and capable of being irrigated from some of the supplies of the Water Company by means of existing structures, or ditches, and that the lands not so situated as to be under the present possibility of irrigation from existing ditches are classed by us as pasture lands and no water is apportioned to same, together with river bottom land, which is not suitable for cultivation.

We wish it to be understood that we have not given attention to the value of any of these lands for dry farming, and if they are valuable for such purposes, we are not appraising said value.

With the foregoing explanation we hereby respectfully submit the following valuations of lands and water rights described herein, and certify that in our judgment the value placed thereon are the fair cash values of said properties.

For convenience, the value of lands and water will be tabulated in column one; the value of lands without water, in column two; and the value of buildings, in column three:

	No. 1.	No. 2.	No. 3.
South-east quarter of south-west quarter, south half of south-west quarter of south-west quarter, section 33, township 6 south. North-west quarter of south-west quarter of north-west quarter, section 4. South-east quarter of north-east quarter, section 5, township 7 south, range 69 west. Lot No. 16444, embracing a portion of said sections 4 and 5, 152,624 acres.....	.....	$765.00	.....
These lands are not irrigable and are only valuable for pasture, except that they lay on both sides of the Platte river and on the Colorado & Southern Railroad in the Platte Canon.			
North-east quarter of south-east quarter, section 33, west half of north-east quarter, section 34, east half of north-west quarter, section 34, south-west quarter of north-west quarter, section 34, north half of south-west quarter, section 34. All in township 6 south, range 69 west, except 13.35 acres conveyed to The Denver, Leadville & Gunnison Railway Co. 306.65 acres.			
Most of these lands are too rough to be of any value for farming purposes, and make very poor pasture. They lay on both sides of the South Platte River and the Colorado & Southern Railroad. At the northern end the valley widens out sufficient to allow of a mill site, and some of this land has some value for this purpose.			
Average value, $9.00 per acre.....	.....	2,760.00	.....
Part of north-west quarter, section 35, township 6 south, range 69 west; part of north-west quarter, section 35, township 6 south, range 69 west; part of north-west quarter of north-west quarter of north-east quarter, section 35, township 6 south, range 69 west.			
Total acreage, 112.97 acres.			
52 We understand that the Platte Canon Reservoir, which is in part of the above land, is much more valuable as an			

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irrigation reservoir than for agricultural purposes, and we do not appraise the same. The remaining portion of the land, amounting in all to 54.7 acres, is worth $15.00 an acre.....	.....	820.00	.....
We understand that there is one cubic foot of water in the High Line Ditch, which we do not appraise.			
Part of north-east quarter of north-east quarter, section 34, township 6 south, range 69 west, 3.22 acres.			
This land has been improved for filter beds and is worth much more for such purposes than any other; to destroy said filter beds and use for other purposes, our value is.....	.....	300.00	.....
Part of the south-east quarter of north-east quarter, section 34, township 6 south, range 69 west, 10.06 acres.....	.....	.....	.....
This land is also used as filter beds, but if not used for such purposes our value is.....	.....	700.00	.....
Part of the north-east quarter of the north-east quarter, section 34, township 6 south, range 69 west, except 3.22 acres above described, 22.99 acres	.....	.....	.....
This land is improved with buildings, used by water system, which buildings are not appraised by us.			
16 acres of land with water.....	$1,600.00	560.00	.....
7 acres	.....	70.00	.....
Part of the south-east quarter of the north-east quarter, section 34, township 6 south, range 69 west, 10.3 acres.			
The river runs through this land, which is not valuable enough to put water with it.....	.....	103.00	.....

53 Platte Canon Lands.	No. 1.	No. 2.	No. 3.

Lehow Lake—Part of the south-west quarter of south-west quarter, section 26, township 6 south, range 69 west, 13.08 acres.

This land is also more valuable for water works than for any other purpose, but if its use is discontinued for such purpose, it would still be valuable for fishing and ice in winter.....	.....	500.00	.....
Platte Valley Ranches.			
Phebe Strong Ranch—North half of north-east quarter, north half of north-west quarter, south-east quarter of north-east quarter, north half of south-east quarter, north-east quarter of south-west quarter, section 22, township 6 south, range 69 west, 320 acres at $5.00 per acre.....	.....	$1,600.00	.....
All of south-west quarter, section 23, township 6 south, range 69 west, and all that part of the north-east quarter, section 26, township 6 south, range 69 west, 200 acres, 126 acres choice land.....	$17,640.00	9,450.00	.....
68 acres dry pasture.....	.....	.....	.....
6 acres river pasture.....	.....	740.00	.....
Buildings are on the south-west quarter of south-west quarter, in all	.....	.....	1,500.00
South-west quarter of north-west quarter, south-east quarter of north-west quarter, south-west quarter of north-west quarter, north-west quarter of south-west quarter, all in section 22, township 6 south, range 69 west, 160 acres at $6.00 an acre.....	.....	960.00	.....
This land is fenced and has water for stock.			
William Strong Ranch and Canon Filter Plant—South-west quarter of south-west quarter, section 14; west half of north-east quarter, section 23; all of north-west quarter, section 23; all in township 6 south, range 69 west, 280 acres. 145 acres of choice land	20,300.00	10,875.00	.....
75 acres upland pasture.....	.....	750.00	.....
60 acres of river bottom, gravelly, appraised as pasture.....	.....	600.00	.....

Value of buildings	.....	.....	500.00
Becky Archer Ranch—North half of south-west quarter, south-east quarter of south-west quarter, south-west quarter of south-east quarter, section 14, all in township 6 south, range 69 west, 160 acres. 130 acres of choice farm land at $140.00 per acre	18.200.00	9.750.00	.....
20 acres dry pasture	.....	200.00	.....
10 acres river pasture	.....	100.00	.....
Value of buildings	.....	.....	1,000.00
Frank Archer Ranch—South half of south half, section 11; all of the north-west quarter, section 14; west half of north-east quarter, section 14; north-west quarter of south-west quarter, section 14; south half of south half, section 15; all in township 6 south, range 69 west, 600 acres, 300 acres choice land	42,000.00	22,500.00	.....
65 acres dry land	.....	650.00	.....
35 acres timber and bottom land, $20.00 an acre	.....	700.00	.....
Buildings on this place are very large and expensive, valuation	.....	.....	8,000.00
Mountain Reservoir Site—South half of section 16; all of south-east quarter of section 17; east half of east half of south-east quarter of north-east quarter, section 17; all of the north half of section 21; all in township 6 south, range 69 west, 810 acres. This land, in our judgment, is only suitable for dry pasture, is fenced and has stock water, $6.00 an acre	.....	4,860.00	.....

55 Platte Valley Ranches.	No. 1.	No. 2.	No. 3.
Dam and Headgate, Harriman Ditch—Part of south-east quarter of south-west quarter, section 35, township 4 south, range 70 west, and part of north-east quarter of north-west quarter, section 2, township 5 south, range 70 west, 11.84 acres. This property protects the head of the Harriman Ditch. We value it for other purposes at	.....	300.00	.....

Harriman Ranch—South half, section 4; south half of north-east quarter of section 4; south-east quarter, section 5; north-east quarter, section 9; north-east quarter of north-west quarter, section 9; east half of south-east quarter, section 9; north-west quarter of south-east quarter, section 9; all in township 5 south, range 69 west, 880 acres. 480 acres choice farm land at $95.00 an acre....	45,600.00	14,400.00	3,500.00
182.8 acres of land not under ditch, valued as pasture land.....	.....	1,828.00	.....
150 acres of good land under ditch, but not irrigable, from the Harriman ditch or reservoir, valued without water at.....	.....	3,750.00	.....
In regard to the 150 acres, we find that this land is under the Bergen ditch and also under the Soda Lakes, but we find that we did not obtain sufficient information in regard to this water supply to concede that it was as full and completely watered as other lands we have valued; therefore, no valuation has been placed upon the water rights mentioned as available for this land in this report. In addition to the above lands, amounting to 812.8 acres, there are 67.2 acres occupied by the Harriman reservoir. This reservoir is of so much greater valuation as an irrigation reservoir than for farm land, that we do not attempt to give its value as farm land and have not agreed on its value as an irrigation reservoir.			
56 Marston Lake Flume. In section 10, township 5 south, range 69 west, 303 acres.....	.....	200.00	.....
Marston Lake Reservoir—14 separate items in list furnished us comprising large reservoir which occupies most of the land mentioned. All the land covered by the reservoir is of greater value for an irrigation reservoir than for farming purposes, and we have not agreed on its valuation for such purposes. As to the lands around the margin of said reservoir, we find that there are 50 acres of good land worth	5,000.00	1,750.00	.....
100 acres valued only as pasture.....	.....	1,000.00	.....

Farm buildings on north side of ranch does not include reservoir structures or boat house	.....	.....	1,500.00

Cherry Creek Lands.

Sullivan Reservoir Site—East half of north-west quarter section 33, township 4 south, range 67 west, 80 acres. We are unable to value this 80 acres for any purpose except as pasture at this time, although we realize that the incompleted works thereon may give it a very much greater value for water works purposes, simply counting the land and ignoring any improvements	.....	$1,000.00	.....
Cherry Creek Gallery Lands—5 items comprising 144.7 acres. We find that in all, approximately, there is about 60 acres of good land, which we figure with water from the High Line Ditch and not in acre feet as in other cases	$6,000.00	3,600.00	.....
The above appraisement is on the basis that the company have $2,400.00 worth of water, all of which can be applied on this land. The value of the remaining 87 acres, classed only as pasture, mostly in Cherry Creek, is only	.....	500.00	.....

57 Cherry Creek Lands.

On the above lands are three dwelling houses, a large store house building, which evidently cost more than $10,000.00, and are not available as good income property at the present time, and while well constructed, brick, shingle roof, has been built for many years. They, however, can be made of some value, and our estimate is	No. 1.	No. 2.	No. 3. $2,500.00

Harriman Ditch Fencing—A strip of land 20 feet in width through the east half of south-west quarter and the south-west quarter of the south-east half, section 6, township 5 south, range 69 west, adjoining the right of way of the Arnett, now the Harriman Ditch.....	.....	50.00	.....
Various parcels, consisting of right of way of the 40-inch conduit on Platte Canon, commencing with three items on page 5 of schedule, comprising the items on page 6, and all items on page 7 of schedule, except the last two. This right of way was carefully examined in some portions, but we did not have the time to walk all over it, and we have decided to give it an average value; the average amounts to 120 acres.....	.....	6,000.00	.....
These parcels of land could be incorporated with adjoining lands for farm purposes, but are probably worth more as a right of way for some future purpose.			
The next item, seepage land, has all been appraised as pasture land in connection with other Marston Lake items.			

Respectfully submitted,
(Signed) J. B. McNEIL,
BURTON D. SANBORN.

58 Schedule of Distribution System Owned by the Denver Union Water Company, Agreed to by J. B. Hunter and W. F. Hawes, December 13, 1907.

Statement of Mileage of the Water Mains, etc., Owned by the Denver Union Water Company, in Use and Operation, November 1, 1907.

Distribution System Within City Limits.

	Feet.	Feet.	Total feet.
2-inch wrought iron pipe	.....	15,600	.....
3-inch cast iron pipe	.....	11,210	.....
4-inch cast iron pipe	.....	243,593	.....
4-inch wood main	3,315	.....	.....
6-inch cast iron pipe	.....	1,035,616	.....
8-inch cast iron pipe	.....	178,104	.....
10-inch cast iron pipe	.....	80,190	.....
12-inch cast iron pipe	.....	264,221	.....
14-inch cast iron pipe	.....	32,272	.....
15-inch cast iron pipe	.....	6,125	.....
16-inch cast iron pipe	.....	64,056	.....
18-inch cast iron pipe	.....	19,016	.....
20-inch cast iron pipe	.....	10,775	.....
24-inch cast iron pipe	.....	51,635	.....
24-inch wood main	2,640	.....	.....
30-inch wood main	22,095	.....	.....
34-inch wood main	28,070	.....	.....
36-inch wood main	2,640	.....	.....
30-inch cast iron pipe	.....	25,141	.....
36-inch iron pipe	.....	360	.....
Total	58,760	2,037,914	2,096,674

397.097 miles.

Flow Lines Within City Limits.

West Denver—	
40-inch wood pipe	9,183 feet
48-inch wood pipe	5,447 feet
Total	14,630 feet

2.771 miles.

Cherry Creek, Now in Course of Construction—	
30-inch wood pipe	11,900 feet

2.254 miles.

59 Recapitulation.

	Miles.
All kinds of pipe in distribution system within city limits.	397.097
West Denver Flow Lines	2.771
Cherry Creek Flow Lines	2.254
Total, all kinds of pipe belonging to The Denver Union Water Company within the city limits...	402.122

Statement of Valves in Distribution System in City Limits, Owned and Operated by the Denver Union Water Company.

2-inch valves	21
3-inch valves	29
4-inch valves	385
6-inch valves	3,005
8-inch valves	484
10-inch valves	183
12-inch valves	595
14-inch valves	59
15-inch valves	9
16-inch valves	82
18-inch valves	27
20-inch valves	12
24-inch valves	51
30-inch valves	16
34-inch valves	1
36-inch valves	1
Total	4,960

Statement of Mileage of Flow Line Conduits, etc., Lying Outside and Leading to the City, Owned by the Denver Union Water Company, in Use and Operation, November 1, 1907.

	Feet.	Feet.	Miles.
30-Inch Line—			
18x30-inch wooden crib	328	.....	.....
30x30-inch wood crib	3,583	.....	.....
24-inch perforated wood pipe	3,111	.....	.....
30-inch wood pipe	82,581	.....	.....
36-inch concrete tunnel	2,288		
		91,891	17.404

60

	Feet.	Feet.	Miles.
34-Inch Line—			
30-inch wood pipe	23,624	.....	.....
6x6 foot tunnel	541	.....	.....
34-inch wood pipe	65,952	.....	.....
36-inch cast iron	156	.....	.....

38-inch concrete pipe	12,204	.....	.....
44-inch wood pipe	8,517	.....	.....
30-inch wood pipe by-pass	1,893	.....	.....
30-inch cast iron pipe by-pass	107	.....	.....
36-inch wood pipe by-pass	2,055	.....	.....
30-inch wood pipe by-pass	390	.....	.....
		115,439	21.863
40-Inch Line—	Feet.	Feet.	Miles.
40-inch wood pipe	.....	89,600	16.971
20-Inch Line—	Feet.	Feet.	Miles.
20-inch wood pipe	.....	10,560	2.000

Cherry Creek Now in Course of Construction.

30-inch wood pipe	13,400	.....	.....
36-inch concrete pipe	2,200	.....	.....
36-inch cast iron pipe	1,400	17,000	3.220
Total of all kinds flow line conduits lying outside and leading to the city, owned and operated by the Denver Union Water Company, November 1, 1907			61.458

Statement of Valves in Flow Line Conduits Outside City Limits Owned and Operated by the Denver Union Water Company, November, 1, 1907.

12-inch valves	1
24-inch valves	1
30-inch valves	6
36-inch valves	2
Total	10

Fire Hydrants Owned by the Denver Union Water Company for Which the City Pays Rental.

Denver	2,262
South Denver	59
Colfax	70
Elyria	56
Montclair	179
Harman	24
Total	2,650

61 *Fire Hydrants Owned by the Denver Union Water Company for which the City Pays no Rental.*

North-west corner of Sheridan boulevard and West Twenty-ninth avenue	1
South-east corner of West Colfax and Homer boulevard	1
South-west corner of West Colfax avenue and Perry street	1
South-east corner of Sheridan boulevard and West Sixteenth avenue	1
On West Colfax avenue west of Sheridan boulevard	2
Corner of Lowell boulevard and West Eighteenth avenue	1
Corner of Lowell boulevard and West Twenty-ninth avenue	1
Corner Boulevard F and West Tenth avenue	1
On Larimer street, opposite city hall	1
On Blake street, between Fifteenth and Sixteenth streets	1
On Stout street, between Fourteenth and Fifteenth streets	1
On South Fifth street, south-east corner West Thirteenth ave	1
Opposite entrance to Fairmont cemetery	1
On east side Delaware street at Cherry Creek Drive	1
At West Denver pumping station	4
At Capitol Hill pumping station	2
Alley west of Detroit street, on Tenth avenue	1
On South Navajo street and West Exposition avenue	1
On South Navajo street and West Alaska avenue	1
On South Navajo street and West Alameda avenue	1
On West Alameda avenue between South Pecos and South Navajo	1
On West Alameda avenue and South Raritan street	1
North-west corner Second avenue and Dexter	1
North-west corner Fourteenth avenue and Bellaire	1
On Blake street at Eighteenth	1
On California street at Fourteenth	1
On Cedar avenue at Franklin street	1
On Hartford street at old hose house	1
On Sixteenth street at South street	1
On Stout street at Eighteenth street	1
On Fifteenth street at Wynkoop	1
On Wazee street at Eighteenth street	1
Total	37

62 Schedule of Distribution System Owned by the City of Denver, Agreed to by J. B. Hunter and W. F. Hawes, December 13, 1907.

Statement of Mileage of Water Mains, etc., Owned by the City and County of Denver, in Use and Operation November 1, 1907, to be Appraised and Purchased by the Denver Union Water Company in the Event of Water Company Getting a New Franchise.

South Denver—	Lineal feet.	Feet.	Miles.
4-inch iron pipe	157,140	.....	.....
6-inch iron pipe	36,965	.....	.....
8-inch iron pipe	13,250	.....	.....
10-inch iron pipe	3,305	.....	.....
12-inch iron pipe	13,935	224,595	42,537

Berkeley—	Lineal feet.	Feet.	Miles.
2-inch iron pipe	11,702	.....	.....
4-inch iron pipe	22,382	34,084	6,455

Globeville—	Lineal feet.	Feet.	Miles.
4-inch iron pipe	22,590	.....	.....
6-inch iron pipe	4,180	.....	.....
8-inch iron pipe	5,290	32,060	6,007
Total	....	.....	54,999

Statement of Valves in Distribution System in the City Limits Owned by the City and County of Denver.

South Denver—		
4-inch values	179	
6-inch valves	26	
8-inch valves	8	
10-inch valves	2	
12-inch valves	3	
		218
Berkeley—		
2-inch valves	8	
4-inch valves	27	
		35
63 Globeville—		
4-inch valves	52	
6-inch valves	10	
8-inch valves	13	
		75
Total valves owned by city		325

Fire Hydrants Owned by the City and County of Denver.

South Denver	121
Berkeley	42
Highlands	346
Barnum	61
Globeville	35
Total	605

NOTE BY BOARD.—The board understands that the compound three million gallon Gaskill pump now on Capitol Hill is the property of the City and County of Denver, and has valued it as part of this property, although not included in the above list, agreed to by J. B. Hunter and W. F. Hawes.

64 *Report on Value of Personal Property, by Hamilton and Reed.*

DENVER, COLORADO, December 12, 1907.

Report to the Board of Appraisers on the Denver Union Water Company as to the value of personalty, embodied in an inventory of material, supplies, furniture, fixtures, equipment, tools, farm produce, livestock, etc., made under and by instruction of the appraisers.

GENTLEMEN: Pursuant to your orders for an estimate of the value of the property in question, we beg to submit the following findings, which are set forth in detail on the following statement, and are agreed to by each of us as fair and equitable to both parties concerned, and take into consideration every item on the list except certain material ordered excepted by the board as per detailed list now in their possession, and except district books, last season's license books, price and equipment records, maps, plants and drawings, lease of office, unexpired insurance, etc., to be considered by your board.

Ashland Avenue Pumping Station—		
Tools	$128.58	
Material	36.94	$165.52
Ashland Avenue New Building—		
Tools	$766.21	
Material	90.00	$856.21
Ashland Avenue Reservoir—		
Tools	$117.05	$117.05
Allendale—		
Tools	$80.00	$80.00
Capitol Hill Pumping Station—		
Tools	$281.60	
Material	417.38	
Wagons and farm implts	36.00	$734.98

Capitol Hill Reservoir—		
Tools	$435.42	.....
Materials	138.73	$574.15
Canon Headgates—		
Tools	$269.96	.....
Materials	120.88	$390.24
Canon Filter Beds—		
Tools	$2,520.13	.....
Materials	6,146.57	.....
Machinery	919.50	.....
Wagons and farm implts	187.50	$9,773.70
65 Canon Filter Plant—		
Tools	$509.54	.....
Materials	455.64	$965.18
Garage—		
Tools	$8,743.42	.....
Material	68.85	$8,812.27
Harriman Ranch—		
Tools	$374.39	.....
Wagons and farm implts	576.30	.....
Live stock	3,275.50	.....
Hay, grain, etc	6,552.41	$10,778.60
Lake Filter Plant—		
Tools	$599.27	.....
Material	826.22	.....
Wagons and farm implts	57.00	$1,482.49
Littleton Office—		
Tools	$273.75	$273.75
Littleton Yard—		
Tools	$457.53	.....
Material	987.21	.....
Machinery	189.46	.....
Wagons and farm implts	75.00	$1,709.20
Littleton Barn—		
Tools	$368.00	.....
Wagons and farm implts	300.00	.....
Live stock	535.00	.....
Grain, hay, etc	90.00	$1,293.20
Lake Cheesman—		
Tools	$925.31	.....
Material	672.55	.....
Machinery	162.75	.....
Wagons and farm implts	24.00	.....
Furniture and fixtures	746.06	.....
Navy	1,656.69	$4,087.36
Lake Marston—		
Tools	$142.22	.....
Material	46.70	.....
Wagons and farm implts	57.75	.....
Navy	1,386.00	$1,632.67

Office, Executive—		
Furniture and fixtures.....	$2,211.43	$2,211.43
Office, Operating—		
Tools	$1,250.32	.....
Furniture and fixtures.....	13,943.75	$15,194.07
Office, Basement—		
Tools	$1,703.66	.....
Material	5,881.79	.....
Furniture and fixtures.	616.94	$8,202.39
66 Platte Canon Ranch—		
Tools	$888.75	.....
Material	14.85	.....
Wagons and farm implts.. ..	831.00	.....
Live stock	6,080.00	.....
Grain, hay, etc.....	7,274.20	$15,088.80
Steam Threshing Outfit—		
Wagons and farm implts.....	$2,480.89	.....
Furniture and fixtures.....	31.00	$2,511.89
Sanitary Laboratory—		
Tools	$1,007.39	.....
Material	39.98	.....
Furniture and fixtures.....	44.85	$1,092.22
Street Outfits—		
Tools	$3,270.59	.....
Material	117.66	$3,388.25
Storehouse—		
Tools	$6,916.34	.....
Material	13,968.73	.....
Machinery	10,386.33	.....
Live stock	2,370.00	.....
Grain, hay, etc.....	445.08	.....
Furniture and fixtures.....	144.03	$34,230.51
University Park Pump—		
Tools	$17.53	.....
Materials	7.34	$24.87
Venturi Meter House—		
Tools	$36.81	$36.81
West Denver Pump Station—		
Tools	$2,231.56	.....
Material	843.30	.....
Machinery	310.00	$3,384.86
West Denver Reservoir—		
Tools	$76.23	$76.23

Summary.

Tools	$34,391.76
Material	30,880.72
Machinery	11,968.04
Wagons and farm implements.....	4,625.44
Live stock	12,260.50

Hay, grain, etc.	14,361.69
Furniture and fixtures	17,738.06
Navy	2,942.69
Total	$129,168.90

Respectfully submitted.

(Signed) A. E. HAMILTON,
C. F. REED.

67 *Inventory of Material in Pipe Yard.*

Material and Amounts Verified by Messrs. Harrison and Stearns, December 19, 1907.

The value of all the material was fixed by the board at $189,330.00.
25,914 sacks of cement.
42,000 pounds of alum.
15,855 pounds of pig lead.

Hydrants—

18 6-inch Gaskill, new.
3 6-inch Gaskill, old.
13 4-inch Gaskill, new.

Cast Iron Pipe—

Length feet.		Size.	Pounds per foot.	Total pounds.	Sum pounds.	Total tons.
1,450		4-inch	22	31,900		
120	(Culls)	6-inch	32	3,840	35,740	
						17.87

Old Pipe—

Length feet.	Size.	Pounds per foot.	Total pounds.	Sum pounds.	Total tons.
1,654.5	8-inch	47.5	78,589		
1,690.5	10-inch	64	108,192		
60	16-inch	143.5	8,610		
72	18-inch	150	10,800		
502	20-inch	185	92,870		
375.5	24-inch	270	101,385		
44	30-inch	333	14,652	415,098	
					207.5

New Pipe—

Length feet.	Size.	Pounds per foot.	Total pounds.	Sum pounds.	Total tons.
1,788	6-inch	...	53,972		
1,811	6-inch	32	57,972		
13,501	12-inch	92	1,242,092		
136.5	14-inch	103	14,069		
4,109.5	16-inch	143.5	589,713		
446	18-inch	150	66,900		
184	20-inch	185	34,040		
590	30-inch	333	196,470	2,255,218	
					1,127.6

68 Pipe Fittings, Cast—

Bends, 90°—

No.	Size.	Weight pounds.	Total pounds.	
9	4-inch	80	720	
14	6-inch	101	1,414	
1	6-inch flange	100	100	
8	8-inch	160	1,280	
1	10-inch	240	240	
6	12-inch double bell	300	1,800	
2	12-inch threaded	...	....	
2	14-inch	400	800	
2	14-inch double flange	400	800	
1	16-inch	600	600	
1	18-inch	720	720	
1	18-inch with base	1,090	1,090	
1	20-inch with base	1,205	1,205	
1	24-inch with 12″ T opening	1,500	1,500	
1	30-inch	2,400	2,400	
				14,669

Bends, 45°—

No.	Size.	Weight pounds.	Total pounds.	
30	4-inch	69	2,070	
28	6-inch	101	2,828	
10	8-inch	213	2,130	
4	10-inch double bell	190	760	
24	12-inch	300	7,200	
1	14-inch	400	400	
2	16-inch	450	900	
2	18-inch	690	1,380	
2	24-inch	1,450	2,900	
1	36-inch	2,800	2,800	
1	20-inch special curve	...	....	
..	10-inch T opening	1,200	1,200	
2	16-inch special c'v's, about 50°	...	....	
				24,568

Crosses—

No.	Size.	Weight pounds.	Total pounds.
23	4 x 4	160	3,680
19	6 x 4	210	3,990
93	6 x 6	220	20,460
18	8 x 4	285	5,130
20	8 x 6	300	5,000
33	8 x 8	345	11,385
2	10 x 4	340	680
28	10 x 6	360	10,080

69

No.	Size.	Weight pounds.	Total pounds.
14	10 x 8	390	5,460
5	10 x 10	405	2,025
4	12 x 4	566	2,264
7	12 x 6	641	4,487
4	12 x 8	450	1,800
7	12 x 10	500	3,500
18	12 x 12	550	9,900
2	14 x 6	570	1,140
5	14 x 8	620	3,100
2	14 x 10	678	1,356
1	14 x 12	743	743
1	14 x 14	770	770
1	15 x 8	650	650
2	15 x 12	760	1,520
2	16 x 6 45°	780	1,560
3	16 x 6	755	2,265
5	16 x 8	788	3,940
6	16 x 10	800	4,800
1	16 x 12	837	837
1	16 x 16	900	900
2	18 x 8	925	1,850
1	18 x 12	1,025	1,025
1	18 x 15	1,080	1,080
1	20 x 6	1,004	1,004
1	20 x 6 45°	1,025	1,025
1	20 x 10	1,110	1,110
4	20 x 12	1,192	4,768
1	20 x 16	1,394	1,394
9	24 x 12	1,550	13,950

1	24 x 14	1,620	1,620	
1	24 x 20	1,780	1,780	
1	30 x 6 30″ for wood	...	....	
	6″ for iron	1,030	1,030	
1	30 x 12 30″ wood	...	....	
	12″ iron	...	3,135	
1	30 x 12	1,800	1,800	
1	36 x 30	5,860	5,860	
1	36 x 20 36″ wood 20″ iron	...	5,000	
				161,853

70 Flange Nipples—

No.	Size.	Weight pounds.	Total pounds.	
1	7.5 x 21.5	100	100	
1	7.5 x 6.5	30	30	
				130

Offsets—

No.	Size.	Weight pounds.	Total pounds.	
6	4-inch	75	450	
36	6-inch	115	4,140	
6	6-inch double bell	135	810	
				5,400

Plugs—

No.	Size.	Weight pounds.	Total pounds.	
8	2-inch	8	64	
58	4-inch	10	580	
24	6-inch	20	480	
116	8-inch	24	2,784	
13	10-inch	37	481	
17	12-inch	52	884	
8	14-inch	70	560	
2	16-inch	88	176	
1	18-inch	120	120	
3	20-inch	150	450	
4	24-inch	185	740	
1	30-inch	370	370	
1	36-inch	810	810	
1	12-inch special	...	....	
1	14-inch special	...	....	
1	16-inch special	...	....	
				8,499

Reducers—

No.	Size.	Weight pounds.	Total pounds.
53	6 x 4	100	5,300
13	8 x 4	110	1,430
12	8 x 6	136	1,632
4	10 x 6	150	600
1	10 x 8	160	160
1	12 x 4	175	175
18	12 x 6	190	3,420
2	12 x 8	215	430
1	12 x 10	230	230
1	14 x 10	250	250

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No.	Size.	Weight pounds.	Total pounds.
1	16 x 8	246	246
2	16 x 10	300	600
7	16 x 12	350	2,450
1	16 x 14	400	400
4	18 x 6	275	1,100
2	18 x 8	365	730
2	18 x 12	400	800
1	18 x 16	500	500
1	20 x 12	490	490
2	24 x 10	650	1,300
1	30 x 24	2,400	2,400

24,643

Sleeves—

No.	Size.	Weight pounds.	Total pounds.
3	3-inch	35	105
31	4-inch	39	1,209
27	6-inch	74	1,998
19	8-inch	83	1,577
16	10-inch	160	2,560
20	12-inch	194	3,880
2	14-inch	212	424
16	15-inch	225	3,600
11	16-inch	240	2,640
1	18-inch	320	320
2	20-inch	370	740
5	24-inch	555	2,775
2	30-inch	1,260	2,520

24,348

Split Sleeves—

No.	Size.
1	10-inch
1	14-inch
1	16-inch
1	18-inch
1	20-inch
3	24-inch
1	Sleeve and double band for mending 2″ pipe.

Special Spigot and Thread—

No.	Size.
22	6-inch
2	4-inch

72 Special Hub and Flange—

No.	Size.
8	4-inch.
11	6-inch.
3	10-inch.
2	12-inch.
1	Special sleeve and double band for 2″ pipe.

Special Spigots, Double—

No.	Size.	Weight pounds.	Total pounds.	
11	4-inch	24	264	
2	8-inch	89	178	
2	10-inch	116	232	
1	12-inch	151	151	
12	18-inch	300	3,600	
8	24-inch	470	3,760	
8	30-inch	660	5,280	
				13,465

Specials—

No.	Size.	Weight pounds.	Total pounds.
1	24-inch 90° bend	....	1,400
1	34 x 30 reducer	....	2,215
1	36 x 34 reducer	....	2,215
5	54 x 36 tees	3,225	16,125
7	30-inch wood to iron	874	6,118
7	48-inch bends	4,420	30,940
2	36-inch wood bell to iron spigot, 12″ long	1,160	2,320
21	Pieces 12″ bell and spigot pipe	171	3,591
9	39 x 36 reducers	2,236	20,124
2	30-inch flange and spigot 36″ long	1,000	2,000
1	20-inch flange and spigot pipe 4′ 6″	920	920

1	18-inch flange distance piece 1′ 3″ ..	340	340
1	18-inch flange distance piece 6′ 4⅞″	1,330	1,330
10	39 x 36 reducers	2,200	22,000
6	34 x 30 reducers	1,925	11,550
			123,188

Special Meter Connections—

No.	Size.
9	4-inch diagonals.
4	6-inch diagonals.
7	4-inch flange and spigots.
4	6-inch flange and spigots.

73 Tees—

No.	Size.		Weight pounds.	Total pounds.
30	4 x 4	.....	124	3,720
1	4 x 6	.....	150	150
28	6 x 4	.....	160	4,480
104	6 x 6	.....	190	19,760
1	6 x 8	.....	195	195
5	6 x 12	.....	210	1,050
16	8 x 4	.....	240	3,840
31	8 x 6	.....	260	8,060
5	8 x 8	.....	280	1,400
2	10 x 4	.....	275	550
14	10 x 6	.....	290	4,060
3	10 x 8	.....	325	975
5	10 x 10	.....	340	1,700
33	12 x 6	.....	360	11,880
2	12 x 8	.....	380	760
1	12 x 10	.....	395	395
8	12 x 12	.....	445	3,560
1	12 x 12	Fl. & bell, bell opening.....	...	450
2	14 x 4	.....	390	780
1	14 x 6	.....	525	525
1	14 x 8	.....	545	545
1	15 x 10	.....	650	650
6	16 x 6	.....	690	4,140
7	16 x 8	.....	736	5,152
3	16 x 10	.....	742	2,226
4	16 x 12	.....	756	3,024
1	18 x 6	.....	807	807
1	18 x 12	.....	1,120	1,120
1	18 x 14	.....	912	912
1	18 x 18	.....	993	993
2	20 x 12	.....	1,022	2,044
4	24 x 6	short	1,000	4,000

2	24 x 6	1,273	2,546
2	24 x 24	1,800	3,600
1	30 x 24	2,335	2,335
1	30 x 30 with lugs for plug brace	...	2,880
1	30 x 30	2,700	2,700
1	40 x 8 iron flange opening	...	4,500
			112,464

74 Wyes—

No.	Size.	Weight pounds.	Total pounds.	
1	6 x 4	218	218	
1	6 x 4	235	235	
1	6 x 6 B. & S. bell opening	...	302	
5	8 x 8	312	1,560	
5	10 x 8	350	1,750	
9	12 x 6	470	4,230	
8	12 x 12	750	6,000	
2	14 x 6	722	1,444	
1	16 x 6	813	813	
2	16 x 16	1,200	2,400	
1	18 x 6	1,250	1,250	
1	18 x 8	1,300	1,300	
6	18 x 10	1,400	8,400	
8	20 x 12	1,800	14,400	
1	36 x 34 x 36 spigots for bell openings for wood	...	7,000	
				51,320

Total weight of fittings.....282 tons

Smith Fittings—

Crosses—

No.	Size.
2	12 x 6
3	12 x 8
2	16 x 6
4	18 x 6
3	18 x 12
2	20 x 6
2	24 x 6
1	24 x 10
2	24 x 12

Tees—

No.	Size.
5	6 x 4
3	8 x 4
3	8 x 6
2	10 x 4
2	10 x 6
3	12 x 4
7	12 x 6
2	12 x 8
2	12 x 10
2	14 x 6
1	14 x 12

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No.	Size.
4	16 x 6
2	18 x 6
4	20 x 6
5	24 x 6
2	24 x 10
1	24 x 12
4	30 x 6
1	30 x 12

Screw Plugs—

No.	Size.
6	4-inch.
57	6-inch.

Split Tees—

No.	Size.
4	6-inch with 4-inch T opening flanged.
4	12-inch with 4-inch T opening.
3	12-inch with 6-inch T opening.
3	20-inch with 4-inch T opening.
1	30-inch with 4-inch T opening.

Valves—

No.	Size.
13	4-inch.
58	6-inch.
8	8-inch.
4	10-inch.
14	12-inch.

Valves—

No.	Size.
14	36-inch valves.
1	30-inch hub bevel gear and 6-inch by-pass, Ludlow 6.
1	30-inch hub single gate hydraulic.
1	30-inch hub bevel gear rising stem 6-inch by-pass.
6	30-inch valves.

1 24-inch hub bevel gear, Ludlow 6.
8 24-inch valves.
2 20-inch valves.
1 18-inch hub bevel gear, Ludlow 6.
1 18-inch Ludlow 6.

1 18-inch hub, hydraulic.
1 16-inch hub, Ludlow 6, rising stem with yoke.
1 16-inch hub, spur gear, Ludlow 6.
2 15-inch hub, spur gear.
2 14-inch hub, Eddy.

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No.	Size.
54	12-inch hub, Ludlow 4.
25	12-inch flange, Ludlow 4.
1	12-inch flange, Ludlow Light.
1	10-inch flange, Ludlow.
35	10-inch hub, Rensselaer No. 4.
32	8-inch hub.
3	8-inch hub, left hand.
2	8-inch swing check.
1	6-inch horizontal check.
1	6-inch hub Rensselaer.
2	6-inch hub, good.
1	6-inch threaded with yoke.
1	6-inch hub, left hand.
2	6-inch flange.
36	6-inch flange, Ludlow 4 wheel.
91	6-inch valves.
5	6-inch check valves.
26	4-inch hub.
4	4-inch hub, left hand.
4	4-inch flange.

200 valve boxes.
300 extensions.
70 uppers.

Wood Pipe Staves—

5,517 feet B. M. staves	30-inch cull.
112,140 feet B. M. staves	30-inch.
169,712 feet B. M. staves	40-inch.
6,205 feet B. M. staves	54-inch.
111,230 feet B. M. stave lumber.	

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Wood Pipe Bands—

				Pounds.	
* 243	½-inch	nuts and washers	30-inch	1,140	
* 1,010	½-inch	bad order	30-inch	5,949	
* 5,794	½-inch	nuts and washers	34-inch	38,820	
18,169	½-inch	nuts and washers	40-inch	143,535	
*114,000	½-inch	nuts and washers	48-inch	1,038,540	
* 31,000	⅝-inch	nuts and washers	48-inch	59,210	
* 30,080	½-inch	nuts and washers double head	54-inch	144,985	
* 49,020	½-inch	nuts and washers double thread	54-inch	300,492	
* 37,685	⅝-inch	nuts and washers double head	54-inch	289,421	
* 33,705	⅝-inch	nuts and washers double thread	54-inch	321,883	2,344,275
84	½-inch	extensions, 28 inches long	24-inch	168	
629	½-inch	bands, nuts and washers	24-inch	3,189	
480	½-inch	bands, nuts and washers, mixed		2,914	6,271
					23,542

Washers for all bands marked "*"

Wood Pipe Clips—

418 pounds,	40 -inch cut		
1,102 pounds,	1½-inch x5 5/16	No. 12 clips	30-inches
8,665 pounds,	1½-inch x5½	No. 12 clips	28-inches
6,751 pounds,	1½-inch x5⅝	No. 12 clips	54-inches
620 pounds,		old No. 12 clips	40-inches
155 pounds,		old No. 12 clips	30-inches

Total, 17,771 pounds.

Wood Pipe Band Castings—

Total, 152,100 pounds.

78 *Schedule of All Other Physical Property Valued by the Board.*

Cheesman dam and reservoir.
Lehow Lake.
Platte Canon Cribs.
Levees at Platte Canon.
River diversion.
Headgates, etc.
Tunnel in Platte Canon.
Bridge carrying pipe.
Dam, headgates, etc., above filters at Platte Canon.
Platte Canon reservoir.

Sedimentation basins at Platte Canon.

Sand filters complete with buildings, pumps, mechanical equipment, railroad siding, grading and fences.

Mechanical filters below Platte Canon.

Marston Lake, including cottages, barn, outbuildings and telephone lines.

Structures at Morrison and between Morrison and Marston Lake.

Mechanical filters at Marston Lake.

Venturi meters.

Cherry Creek galleries and collecting works.

Mississippi street cribs and collecting works.

Ashland avenue reservoir.

Capitol Hill reservoir, large and small basins.

West Denver reservoir.

University avenue standpipe.

Alameda avenue standpipe.

Capitol Hill standpipe.

Capitol Hill pumping station, old and new parts, with all machinery, including new ten million Worthington pump, complete.

Ashland avenue pumping station, old and new parts, including new five million gallon pump, complete.

Montclair pumping station.

University avenue pumping station.

West Denver pumping station, including machinery, operated by water power and by steam, water power and connections, blacksmith shop and garage, barn and sheds, storehouse for cement, office building, railroad side-tracks and platforms and stave shed.

All auxiliary works and appurtenances of every description, as they actually exist, are included with the respective items.

79 Lake Cheesman lands, including the land on which the dam and reservoir are built, and surrounding lands, in all, 8,436 acres, more or less.

Rights of way for all pipe lines laid in private lands, the fee of which is not in The Denver Union Water Company.

District books, last season's license books, price and equipment records, maps, plans and drawings.

80 Eleventh. Since the date to which said appraisement referred, to-wit, October 20th, 1907, complainant has expended in betterments, improvements, extensions and additions to its properties and water system, as so appraised by said Board of Appraisers, the sum of two million, sixty-four thousand, six hundred thirty-one dollars and eight cents ($2,064,631.08), at the following times and for the following purposes:

Date.	Character of betterment, improvement or addition.	Amount.
1908	Conduits, Pipe and Pumping systems, miscellaneous	$197,924.64
	" " " " " "	122,018.07
1909	" " " " " "	544,417.11
1910	" " " " " "	609,299.24
1911	" " " " " "	409,599.35
1912	" " " " " "	161,856.57
1913	Conduits, pipe system and miscellaneous	19,516.10
1914	(to date) " " " "	
	Total	$2,064,631.08

The above expenditures represent the actual and reasonable cost and value of said betterments, improvements, extensions and additions, and each and every thereof was necessary and proper in order to provide the defendant the city and county of Denver and its inhabitants with an ample supply of water for all purposes, and to protect the city and county of Denver in its growth.

Twelfth. Complainant, prior to April 10th, 1910, pursuant to and in accordance with the provisions of Article XX of the Con-
81 stitution of the State of Colorado and the Charter of the city and county of Denver, prepared and caused to be submitted to the tax-paying electors of the city and county of Denver at the general election held May 17th, 1910, a franchise and contract to be entered into between complainant and defendant the city and county of Denver, providing upon reasonable and fair terms, for a continuance of the relation between the complainant and defendant the city and county of Denver, and the supplying of water by complainant to the city and county of Denver and its inhabitants, which said proposed ordinance and franchise was defeated and rejected by defendant the city and county of Denver at said election; there was at the same election submitted to the voters a proposition for the defendant the city and county of Denver to purchase the water system and property of complainant upon a new appraisement, which was likewise and at said election defeated and rejected. At the same election, and subsequent to the appraisement of fourteen million, four hundred thousand dollars ($14,400,000.00), there was initiated and submitted to the voters of defendant, the city and county of Denver, Section 264-A of the Charter, creating a Public Utilities Commission, composed of three members, the defendants Armour C. Anderson, Edwin Van Cise and A. Lincoln Fellows, and provided that the complainant should be offered the sum of seven
82 million dollars ($7,000,000.00) for its property theretofore jointly appraised at fourteen million four hundred thousand dollars ($14,400,000.00), and in case such offer should not be accepted by complainant, steps should be taken to construct and build a complete competitive water system at a cost of not to exceed eight million dollars ($8,000,000.00), which said Charter Amendment, being Section 264-A of the Charter, was adopted.

At a special election held in the city and county of Denver on February 17th, 1914, there was submitted to the electors and taxpaying electors of defendant a contract to purchase, by which the defendant the city and county of Denver was to purchase the water system and properties of complainant theretofore appraised, as hereinabove alleged, together with all betterments, improvements, extensions and additions thereto, at a price to be fixed by an appraisement, in which the Public Utilities Commission were to act as appraisers for defendant the city and county of Denver, and pending the consummation of said purchase complainant was to operate said water system upon a profit sharing basis yielding far less than a reasonable return to complainant upon the reasonable and actual value of its properties, and which said contract was prepared and proposed by The Retail Association of the Denver Chamber of Commerce, and which complainant agreed to accept and abide by if the same were voted favorably on by the tax-paying electors of
83 the city and county of Denver. Said contract to purchase was rejected and defeated at said election on February 17th, 1914.

At various times since April 10th, 1910, complainant has offered to sell its properties and water system as heretofore appraised by representatives of complainant and defendant the city and county of Denver, together with the betterments, extensions, improvements and additions thereto, as set forth and alleged in this bill, at a price to be fixed by any fair method of appraisement, but defendant the city and county of Denver and the Public Utilities Commission has refused to accept said offers and has made no attempt either to acquire the said properties and water system of complainant or to grant for a definite time a contract or franchise to complainant for the further supplying of water to defendant the city and county of Denver or its inhabitants, except as set forth in Section 264-A of the Charter.

Regardless of the offers and attempts heretofore made by complainant to have fixed the relations between complainant and the city and county of Denver concerning the continuance of supplying water to the defendant the city and county of Denver and its inhabitants for all purposes, or the sale of its properties, and of the rejection of said offers by the city and county of Denver and the refusal on its part to propose any terms or method for the continuance of
84 said supply of water, or the purchase of the properties of complainant, complainant has been compelled to and is now compelled to continue to serve the defendant the city and county of Denver and its inhabitants with water, because there is no other supply of water available to defendant or its inhabitants and a cessation of said service for a period of twenty-four hours would result in great suffering, damage and loss of life. Because of the necessity aforesaid, complainant has continued to so supply the city and county of Denver and its inhabitants with water, although under no legal obligation so to do, and although defendant the city and county of Denver has since April 10th, 1910, declared complainant to be a trespasser in the streets and public ways of the city and

county of Denver, but without waiving in any way its right to discontinue such service at any time, and to devote its property to other uses.

Defendants, and the inhabitants of the city and county of Denver, have no other source of water supply for themselves; no plans or specifications for the construction of a complete and independent water system as proposed under Section 264-A of the Charter, and no water or water rights even partially adequate for the purpose of supplying the city and county of Denver and its inhabitants with water. A complete and independent water system for the city and
85 county of Denver, even if possible of construction and assembly, could not be constructed in less than seven years from the date of the beginning of such construction, and during such construction the city and county of Denver and its inhabitants will be entirely dependent upon the properties and water system of complainant for their water supply and service. Regardless of the above facts and conditions, defendants have rejected every offer of complainant to sell its properties and water system to the city and county of Denver at a fair, reasonable and appraised price, or to have fixed the terms and rates for the continuance of the supplying of the city and county of Denver and its inhabitants with water, and have threatened and are threatening to destroy all, or a large part, of the property of complainant and its value and to acquire complainant to continue to devote its properties and water system to supplying defendant the city and county of Denver and its inhabitants with water, at rates and charges and upon terms which will not yield a fair or reasonable return upon the actual value of the property so required to be devoted to such public use, and without authorizing or permitting complainant to so continue, for a fixed and reasonable time of such duration as will permit it to protect its property during such enforced service, and receive compensation reasonable under all such conditions.

Thirteenth. Water rates and charges under the Leaflet Schedule
and the schedules prior thereto have during the corporate
86 existence of complainant at all times been payable in advance semi-annually on the first days of May and November of each year, and the fiscal year of complainant begins on the first day of November in each calendar year. Complainant now has and during the last fiscal year had 44,280 water consumers in the city and county of Denver connected with its water system and receiving their entire water supply for all purposes from complainant, and during the coming year from May 1st, 1914 to May 1st, 1915, the number of water consumers will be approximately the same. For the various completed fiscal years since the joint appraisement hereinabove referred to the financial operations of complainant have been as follows:

Year.	Gross earnings.	Operating expenses.	Taxes.	Net earnings without deductions for depreciation, obsolescence, etc.	Interest on bonded debt.	Net income or surplus.
1908	$1,067,388.22	$232,530.70	$91,947.28	$742,910.24	$513,759.32	$229,150.92
1909	1,168,808.86	255,360.16	95,301.98	818,146.72	513,995.48	304,151.24
1910	1,255,794.60	308,173.76	113,386.52	834,234.32	525,071.07	309,163.25
1911	1,337,500.57	325,053.53	117,132.90	895,314.14	536,537.41	358,776.73
1912	1,383,977.75	331,564.31	115,842.18	936,571.26	534,205.81	402,365.45
1913	1,373,337.90	352,242.42	117,146.62	903,948.86	540,944.82	363,004.04

In the foregoing financial statement no allowance or deduction has been made from gross earnings for depreciation, obsolescence or unusual contingencies to which the properties of complainant are liable, and which amount to not less than the sum of one
87 hundred and seventy thousand dollars ($170,000.00) annually, which said sum, together with operating expenses and taxes, should be deducted from the gross earnings to ascertain the net earnings and the annual rate of return or earnings upon the present actual value of the properties of complainant devoted to and necessarily devoted to the supplying of the city and county of Denver and its inhabitants with water.

Fourteenth. Since the appraisement hereinabove referred to, complainant has furnished to the city and county of Denver and its inhabitants, the following quantities of water:

Year.	Total gallons.	Maximum day.	Average per day.	Minimum day.
1908	16,006,600,000	58,100,000	43,700,000	33,900,000
1909	16,265,000,000	60,300,000	44,600,000	35,800,000
1910	17,933,800,000	68,800,000	49,100,000	37,600,000
1911	17,887,700,000	68,400,000	49,000,000	33,800,000
1912	15,839,400,000	64,400,000	43,300,000	32,600,000
1913	16,792,300,000	72,300,000	46,000,000	32,700,000

The per capita consumption per day during the foregoing years has been in excess of two hundred (200) gallons.

All of the water so supplied the city and county of Denver and its inhabitants was filtered water, pure, wholesome and potable.

The consumption of water for the year beginning May 1st, 1914 and ending May 1st, 1915, will be approximately the amount hereinabove set forth as furnished for the year 1913, and will
88 likewise be filtered water, pure, wholesome and potable.

Fifteenth. Neither defendant the city and county of Denver nor the Public Utilities Commission prior to August 11, 1913, made any attempt to examine investigate or value the properties and water system of complainant through capable or experienced men or engineers, or to investigate the possibility, feasibility or cost of constructing a complete independent plant or water system for defendant the city and county of Denver capable of supplying it and its inhabitants with all of the water necessary for all purposes.

On August 11th, 1913, the defendant the city and county of Denver and the Public Utilities Commission appointed one of its own members. A. Lincoln Fellows, and two other engineers, to-wit, C. P. Allen and Edmond C. Van Diest to inspect, examine, value and report upon the properties and water system of complainant and the plans and costs of construction of a new and complete water system for defendant the city and county of Denver capable of supplying it and its inhabitants with water for all purposes. Said three engineers so appointed entered immediately upon their duties and were continuously engaged therein until January 14th, 1914, at which time they presented to defendant the city and county of Denver and said Public Utilities Commission a complete and volu-

minous written report, setting forth the result of their labors
89 and investigation, which said report was not submitted, however, until after said Public Utilities Commission had requested said three engineers to eliminate from said report certain statements and valuations more favorable to complainant and its properties, than those contained in said report as filed.

Said Engineers in said written report to said Public Utilities Commission unanimously made the following statements in reference to the properties and water system of complainant:

We find the system to be generally in excellent working condition, well maintained and well managed, and adequate for supplying the city's present needs. The very thorough survey made by the Engineers of the Fire Underwriters' Association indicates that the system is, in general properly gridironed and the fire service satisfactorily supplied. If the report had been followed by rate revision, the rate should be as low in Denver as in any city in the United States for a similar risk.

The water system is in efficient operating condition and the water supply as pure as possible and adequate for all present needs. If the property is taken over by the city, no emergency measures for immediate additional supply, nor any other immediate construction or improvements will be necessary, excepting such extensions of the distributing system as growth and development in different parts of the city may require.

We have listed, but have not valued the water rights claimed by The Denver Union Water Company, as the courts have held that
90 water is the property of the consumer and the Company cannot be considered other than a "Carrier." Whether the Company has not acquired the prior or even the exclusive right to carry the water, defined in the list of appropriations, to the consumers, the courts only can decide. We desire to suggest that this is the only real point of controversy left, and that a compromise will enable the city to enter into possession of the property speedily, and eliminate the further heavy expense and tedious delays attendant upon a final adjudication through the courts, and settle a controversy which has already been pending since 1907.

The general purity of the water supply and the reduction in the number of typhoid fever cases as the filter plants were installed, is well illustrated on the chart of typhoid statistics appended. Notwithstanding the increase in population the number of deaths from typhoid fever in 1912 was the lowest in the history of the city.

If the public is not ready or willing to incur the risks of first providing its necessities or conveniences as communities grow, and is willing to allow a corporation or individual to under take the risk by granting a permit, and when this permit has expired desires to serve itself, all the risks having been overcome, if the rates paid have not provided a fair return for the full period of the permitted operation, then at least this deficiency must be included in the price to be paid for the property when the permit expires.

Your Committee has duly considered that the interest basis adopted (7% with 1% added for depreciation, or a total of 8%),

represents a fair earning at the present time, but may not represent a fair earning during the earlier periods of the Water Company's operations.

91 It would not be possible for the city of Denver to divert the water which the people of the city as consumers own, without compensating The Denver Union Water Company and The South Platte Canal & Reservoir Company for the destruction or loss of its property, used for conveying this water to the City, constructed at great expense for the sole purpose of supplying the community. It cannot be denied that if these companies were deprived of the right of Carriage and Storage by reason of changes in the diversion of the water, this property would be destroyed, as it is of such a character that it is not susceptible of removal or re-use, so that no material salvage value can be applied.

The attached list summarizes the value of that part of the property of The Denver Union Water Company and The South Platte Canal & Reservoir Company which we believe the city of Denver should own in connection with the water system and as an essential part of the property, either present or prospective.

We estimate the net value of the property as specified, exclusive of "Going Concern Value" or "Rights of Carriage of Water, as of November 1st, 1913, including all property necessary for the proper operation of the plant under municipal ownership to be $10,044,-778.31.

Free Water Supplied to the City of Denver by the Denver Union Water Company, during the year 1912.

Recapitulation.

Street Cleaning Department	37,350,000	gallons
Sewer Flushing	87,182,400	"
Automatic Sewer Flushers	1,292,100,000	"
Street Sprinkling Department	263,659,200	"
	1,680,291,600	"
Average per day	4,603,539	"

92 With these, and as the most important element of all, is the maintenance of a supply of pure water, well in excess of possible growing demand for domestic purposes, and for the agricultural development of the fertile lands to the east. It is already well known that the water supply available, and tributary to Denver from the eastern slope of the range, has been over appropriated, more reservoirs have been already constructed in several districts than the average flow, both normal and flood, will regularly fill.

And concerning the construction of a complete and independent municipal plant:

Estimates of Cost of Acquiring or Constructing a Complete Water System for the City of Denver, By Any of the Methods Proposed.

We cannot recommend the construction of a new system, for reasons hereinafter stated and for the further reason that considerable time will be required to secure an adequate supply, complete the legal details necessary to change the use from irrigation supply to a continuous domestic use, etc. and when secured surveys and preparations of construction plans will require at least a year's time. Tunnels, reservoirs, filters and conduit system for conveying the water to the city could not at the best be constructed in less than four or five years thereafter.

We cannot recommend the installation of a new distributing system. The cost of reconnecting the 44,000 services now in use is estimated approximately at $440,000.00. The cost to the consumers and citizens in inconvenience, temporary service interruptions, obstruction to traffic, damage to the many miles of paving and street surfacing, with probable serious fire risks, would be considerably greater, but is not susceptible of computation.

93 As elsewhere estimated, without allowance for delays in legal proceedings, it should be possible to construct a new water system complete in serviceable operation and providing service in 5 years.

Approximate cost:

Lands and Water Rights	$750,000.00
Reservoirs and Canals	2,500,000.00
Conduits	2,500,000.00
Hydro-Electric Plant	300,000.00
Filters	200,000.00
Distributing System	4,500,000.00
Engineering, contingencies & interest during construction	2,000,000.00
	$12,750,000.00

The plan can only be outlined briefly in a very general manner, and its feasibility indicated. If the Western Slope diversion and tunnel were found necessary, about $3,500,000.00 would be added to the cost, and as above includes a hydro-electric development.

The elements to be considered are: the inconvenience to the public, practicability, expense and time required, with their effect on rates. The inconvenience to the public consists in the interruption of service and serious impairment of general traffic conditions throughout the city during the time required to re-lay mains, make the necessary service connections, and re-lay the pavements, and also the additional time required to enable the Water Company to remove its own mains, hydrants, etc. after the city system had been installed. This would require another two years during which the streets and even the sidewalks in places would have to be torn up.

The indirect loss to the city in patched paving that would result would be as great, or greater, than the extra cost of the new service.

94 Your committee does not consider it impossible to install a complete new distributing system, nor do we believe that the health of the city would be affected by the opening of the streets, but we are convinced that it is not advisable to do so, that great inconvenience to traffic and to the public generally would result, and that the cost would be considerably in excess of the gross replacement value of the present system. Reconnecting 44,000 service connections would have to be included in the cost as it would be unjust to the consumer to require him to pay for a new connection.

The 'Economic Waste' involved in the destruction of the existing plant, which is in good operating condition, rendering adequate service, by the construction of a new municipal plant, is not to be contemplated, except as a last resort, and until every reasonable method of securing the present plant for the city on an equitable basis has been exhausted.

To the foregoing estimate of cost of a new system, we should properly add the loss of profit that would accrue to the city by the purchase of the existing plant during the period of new construction. Since the expiration of the franchise, the city has, by ordinance, ordered the Water Company to extend mains in several parts of the city. These the city would be under obligation to purchase.

All estimates of cost of a new system throughout must be mere approximations which experience would probably prove to be erroneous in many particulars.

Necessary information, such as surveys and detailed plans would develop, is wanting in every essential element.

Such a plan as heretofore suggested would naturally involve the purchase of Lake Cheesman by agreement or condemnation with the storage rights that are a part of it, and belong to The

95 South Platte Canal & Reservoir Company.

It would not be possible to construct so extensive a plant as that of The Denver Union Water Company within a period of time so short, as to virtually obviate any interest charges on the growing investment, even though all the plans and specifications had been completed.

Notwithstanding this favorable condition, we have estimated that five years would be required to replace the plant as it exists at present.

It would be equally unjust to destroy at least the major portion of the value of the property which has been rendering satisfactory service and can continue to render service to the public adequately and efficiently, by the construction of a competitive plant.

To refuse a fair capital return to any public utility corporation is but to smother enterprise, limit development and prevent growth of the community, and the welfare of its inhabitants.

The water and water rights belonging to complainant and used and necessarily in use supplying the defendant, the city and county of Denver and its inhabitants with water, and which were omitted

by said Engineers in their appraisement of the value of the properties of complainant, are of the present fair and actual value of three million, five hundred thousand dollars ($3,500,000.00), and were separately appraised by the joint appraisers of complainant
96 and the city and county of Denver in 1907 at the value of two million, eight hundred and forty-five thousand, nine hundred and twenty-five dollars ($2,845,925.00).

The "Going Concern Value" omitted by said Engineers and which is an integral and necessary part of the unit value of the properties and water system of your complainant, amounts to not less than fifteen per cent (15%) of the total value of the physical properties and water rights of complainant.

In the above described investigation, inspection and valuation of the properties and water system of complainant by defendant, the city and county of Denver, the Public Utilities Commission and the Engineers appointed by said Public Utilities Commission, complainant afforded to said Engineers and said Public Utilities Commission all facilities and opportunities for the investigation and valuation of said property and water system, and also the inspection and examination of all records, statements and data possessed by the complainant in reference thereto.

The inspection, examination and valuation aforesaid by said Engineers appointed by defendant the city and county of Denver and said Public Utilities Commission was entirely ex parte and without notice or opportunity to complainant to participate therein or to be present at meetings of said Engineers, or to present to said
97 Engineers on behalf of complainant testimony, data, information or argument concerning the extent, quality and value of the properties and water system of complainant. Had such opportunity been so afforded to complainant the valuation placed upon the properties of complainant by said Engineers would have approximated the appraised values fixed by the joint appraisers appointed by the complainant and defendant the city and county of Denver in 1907.

In September, 1913, complainant, being desirous of having its properties and water system completely and accurately re-inventoried and re-valued, as of the present time, and in order to adjust the inventory and valuation of its properties and water system under the appraisement of 1907 and in accordance therewith to date, employed two civil and hydraulic Engineers of national standing of the highest integrity and the widest experience, to-wit, George G. Anderson of the city and county of Denver, state of Colorado, and Leonard P. Metcalf, of Boston, Massachusetts, to completely and thoroughly inspect and inventory all of the properties and water system of complainant used and necessarily being used in supplying the City and County of Denver and its inhabitants with water, and to fix the actual present value of said properties and water system. Said Engineers, Anderson and Metcalf, were from September 13th, 1913 to
98 February 14th, 1914, a period of approximately five months, continuously, with agents and representatives selected by them, engaged in inspecting inventorying and valuing said prop-

erties and water system of complainant. Said Anderson and Metcalf completed and filed with complainant a detailed and comprehensive inventory of all of the property constituting the water system of complainant and now used and necessarily used in supplying the defendant the city and county of Denver and its inhabitants with water, and fixed and determined its actual present value at sixteen million, sixty-three thousand dollars ($16,063,000.00).

Sixteenth. Prior to the 1st day of February, 1914, the Public Utilities Commission caused to be prepared a certain bill for an ordinance to reduce and regulate the charges heretofore and in the year 1913, and for several years precedent thereto, charged by complainant for supplying water to the city and county of Denver and its inhabitants. Said bill for an ordinance, so prepared under the direction of the Public Utilities Commission, was introduced in the Council of defendant, the city and county of Denver, and on the 3rd day of March, 1914, was passed and enacted by said City Council, approved and published in accordance with the Charter of defendant, city and county of Denver, and is known as Ordinance No. 26 of the Series of 1914, a true copy of which is hereto attached as Exhibit
99 "A" and as a part of this bill of complaint. Said ordinance No. 26 of the Series of 1914, was prepared and enacted without consultation or conference with complainant; without any notice to complainant or any opportunity afforded complainant to be heard in reference to the matters therein contained, and the effect thereof on the income and properties of the complainant. Neither the defendant, the city and county of Denver, or the Public Utilities Commission, or any member thereof, or the Council of the city and county of Denver, or any member thereof, attempted, prior to the enactment of said ordinance, to investigate the fairness or justness of the rates therein provided to be adopted by complainant, or the effect thereof on the income or properties of complainant. Said ordinance was conceived, prepared, drafted and enacted without reference to the fairness of the rates therein prescribed, or the effect on the properties and income of complainant, but for the purpose of crippling and hampering complainant in the operation of its water system and to depreciate the earning capacity and value of the properties and water system of complainant, in order to enable defendant, the city and county of Denver, and said Public Utilities Commission, to purchase and acquire the properties of complainant at less than fair actual present value, and less than the value heretofore fixed and determined through the joint appraisement of 1907
100 aforesaid, and the values ascertained by the Engineers appointed by said Public Utilities Commission.

The schedule of rates contained and set forth in said Exhibit "A" follows generally the items and form of schedule "A" and the "Leaflet Schedule" and which later schedule constituted the basis of charges by complainant to the city and county of Denver and its inhabitants for the year 1913, and for several years previous thereto. The purpose and effect of the enactment of said Exhibit "A" was declared by defendant, the city and county of Denver and the members of the Public Utilities Commission and members of the Council,

to be to reduce the rates under said Leaflet Schedule twenty per cent (20%) horizontally.

Seventeenth. Said Exhibit "A" in fact, reduces the charges to be made by complainant, and the gross earnings to be derived thereunder, in excess of twenty-one per cent (21%) on the general list of items, and also provides that certain water and service shall be supplied and rendered by complainant to defendant, the city and county of Denver, without charge, which said water and service were and are of the reasonable value, and under said Leaflet Schedule of approximately one hundred thousand dollars ($100,000.00) per year, and the water and service so required to be rendered free by complainant to the city and county of Denver for the year beginning May 1st, 1914 and ending May 1st, 1915, will be worth the sum of
101 one hundred thousand dollars ($100,000.00).

Exhibit "A" likewise provides for certain other free service and water to the inhabitants of the city and county of Denver, and fixes terms and conditions for certain services which would make it impossible for complainant to collect any charge therefor. Exhibit "A" fixes a charge of $18.00 per year for every hydrant, which is a reduction of $4.50 per year per hydrant from the lowest charge ever made by complainant to the city and county of Denver for such service and which is more than $7.00 per hydrant per year less than the reasonable and fair charge for said hydrant service.

Eighteenth. In case said Exhibit "A" is enforced against complainant, and complainant is permitted to charge only the rates therein fixed for the coming year, beginning May 1st, 1914, and ending May 1st, 1915, the gross earnings of complainant for said year from the operation of its properties and water system used, and necessarily used in supplying defendant, the city and county of Denver and its inhabitants with water, will be more than two hundred eighty-nine thousand, two hundred and fifteen dollars ($289,215.00) less than for the fiscal year 1913, which will likewise constitute the reduction in the net income of your complainant, because the operating expenses, taxes, depreciation and other deductions to
102 which complainant is legally entitled, would remain and be the same in the year 1914-1915 as they were in the year 1913 and as hereinabove alleged. The number of water consumers who will be supplied, and who must be supplied through the properties and water system of the complainant, for the year 1914-1915, will be the same as they were for the year 1913. The amount of water consumed will be approximately the same, and owing to the fact that charges to defendant, the city and county of Denver and its inhabitants, are almost entirely upon a fixed schedule of rates, it is possible to figure almost the exact income to be derived by complainant from the operation of its properties for the year 1914. Under Exhibit "A" the result of the operation of properties of complainant will be as follows:

May 1st, 1914 to May 1st, 1915.

Gross earnings.	Operating exp.	Taxes.	Depreciation and obsolescence, etc.	Net earnings.
$1,084,122.53	$333,045.06	$120,000	$170,000.00	$461,077.47

The depreciation and obsolescence charge above set forth includes only a reasonable allowance for the actual depreciation and obsolescence upon the properties and water system of complainant, by its nature necessarily subject to depreciation and obsolescence and employed and used by complainant in the supplying of the city and county of Denver and its inhabitants with water.

103 The net earnings of complainant under Exhibit "A" and the rates, charges and terms fixed therein, if the same is enforced, will for the year May 1st, 1914, to May 1st, 1915, return to complainant upon the present actual value of the properties and water system of complainant, used and necessarily used in the supplying of the city and county of Denver and its inhabitants with water for all purposes during the aforesaid year, less than two and eighty-eight hundredths (2.88%) per cent.

Nineteenth. Each and every of the defendants have declared, and are declaring, their purpose of enforcing and threatening to enforce, all of the terms and provisions of said Exhibit "A" on and after May 1st, 1914, and are advising and urging the inhabitants of the city and county of Denver not to pay rates or charges to complainant except in accordance with said Exhibit "A" and the rates therein fixed. Defendants, and the inhabitants of the city and county of Denver will, unless restrained and prevented by an order of this court from enforcing Exhibit "A", refuse to pay to complainant other reasonable charges for the water and services supplied to them by complainant, and as fixed in the Leaflet schedule, or any charges other than those fixed in said Exhibit "A".

Twentieth. By the Fifth Amendment of the Constitution of the United States, it is provided that no person shall be deprived

104 of property without due process of law, and that private property shall not be taken for public use without just compensation; and in the Fourteenth Amendment to the Constitution of the United States it is further provided that "no state shall make or enforce any law which shall abridge the privileges or immunities of the citizens of the United States, nor shall any state deprive any person of life, liberty or property without due process of law, nor deny to any person within its jurisdiction the equal protection of the law." This is a case arising in equity under the Constitution of the United States, and the judicial power of this Honorable Court extends to and embraces this case and its issues, as complainant is informed and believes, and the issues herein set forth involve federal question under said Constitution of the United States. By reason of the acts and facts and things herein alleged the rates provided in Exhibit "A" are unreasonable, unjust, fraudulent, confiscatory, ambiguous, uncertain and unintelligible, and if enforced will compel complainant to conduct its business and operation without fair remuneration, and as to certain portions of said business and operations and supplying of water without any remuneration or compensation. Said rates and terms as provided in said Exhibit "A" are violative of and prohibited by each and all of the said provisions of said Constitution of

105 the United States, and by reason of and under said provisions are null and void.

Complainant, under said Exhibit "A" will be compelled to furnish water to defendant the city and county of Denver and its inhabitants, at less than the fair, reasonable and just value of the services rendered, and by the enforcement of said rates and terms of said Exhibit "A" complainant will be deprived of property without due process of law, and will be deprived of property without any process of law in violation of the provisions of the Constitution of the United States, and the property of complainant will be taken for public use without just compensation and in some instances without any compensation, and by and through the enforcement of said Exhibit "A" the privileges and immunities of complainant will be abridged and the equal protection of the law denied to it in violation of the provisions of the Constitution of the United States.

Exhibit "A" and the rates and terms purported to be fixed thereby, were and are wholly void, null, unjust, unreasonable, fraudulent and unconstitutional under the provisions of the Constitution of the United States, oppressive, confiscatory, ambiguous, uncertain and unintelligible, and said rates do not permit of or provide for a just or fair or reasonable compensation for water and service to be supplied after May 1st, 1914, and during the year from May 1st, 1914
106 to May 1st, 1915, to the city and county of Denver and its inhabitants.

Twenty-first. Section 2 of Exhibit "A" was and is unreasonable and unjust and unconstitutional under the provisions of the Constitution of the United States herein referred to, and confiscatory, and is greatly inadequate as a compensation to complainant for the services therein contemplated; such services contemplated for said hydrant rentals, excluding any service except fire service and protection, are reasonably, fairly and justly worth the sum of more than $25.00 per hydrant per year, and the value of complainant's property and water system actually in use for this part of such service, over and above and in excess of the value of the property of complainant required and necessary for all other uses of water supplied by it in the premises, has been, and will during the year from May 1st, 1914 to May 1st, 1915 be, largely in excess of the principal sum which, even at six per cent. per annum income, would produce said rate or revenue of $25.00 per year per hydrant.

The gross income received by the complainant for the year ending May 1st, 1914, to-wit: one million, three hundred sixty-three thousand, one hundred twenty-one dollars and eighty-six cents ($1,363,121.86), did not yield a fair interest or return upon the actual value of the property, actually and necessarily used in supplying
107 the city and county of Denver and its inhabitants with water, after deducting operating expenses, taxes and depreciation, obsolescence and other deductions to which complainant is entitled.

Twenty-second. Included in the properties and water system of complainant are certain physical properties or portions of said water system, which are, by their nature and the uses to which they are subjected, constantly undergoing depreciation. Complainant is entitled to have its property devoted to the public use of supplying the city and county of Denver and its inhabitants with water, re-

main unimpaired in value and to receive for the water supplied and services rendered a reasonable return upon the value of the property so devoted to said uses, and a sufficient amount to protect said property against depreciation and other impairments of value. It is now a common practice for Companies of the character of complainant to make an annual allowance for insurance against destruction by fire or other casualty, for depreciation, aging and wearing out and obsolescence of plant, and to provide a fund for replacing said property when destroyed or worn out and when it has become obsolete. There is continually in progress in all water systems, a waste and depreciation due to its use, ravages of time and action of the elements, a portion only of which wear and decay can be offset by ordinary and current repairs. All the property thus
108 depreciated or worn out must be replaced sooner or later if the integrity of the water system is to be maintained, and the cost of re-placing such portions of a water system enter into the cost of furnishing, supplying and delivering water. To maintain a water system and to maintain the properties and water system of complainant, it is necessary to provide for, (*a*) ordinary depreciation, and (*b*) obsolescence of portions of the plant. The necessity of making an annual allowance to cover depreciation and obsolescence arises from the fact that the item (*b*) above must be made periodically rather than currently or annually, although the actual wearing out is constantly progressing. The re-placing of worn out and obsolete portions of a water system as necessity arises therefor, is as essential to the maintenance of the water system in its integrity as is the making of current repairs. The practice of making an annual allowance for depreciation and obsolescence has become so well established, and is so clearly nece-ssary and right, that public service commissions in many states, in the instructions which they issue in relation to the keeping of accounts and making of repairs of public service corporations, expressly provide for a separate statement of such items, and the term "obsolescence" is now and has been for many years last past generally accepted by accountants as the proper term as indicating the loss resulting from dis-
109 carding property, plant and machinery before it is worn out, and the substitution therefor of improved property, plant and machinery by means of which any commodity can be more economically furnished and supplied. Such depreciation and obsolescence do not effect in any way the ability of complainant to supply the water needed by the city and county of Denver and its inhabitants, nor will they do so, but as hereinbefore alleged they constitute an annual expense to complainant in supplying said water and rendering said service. Complainant is also entitled to an allowance to cover extraordinary casualties and contingencies, such as fire and flood, which have occurred and may occasion loss and damage to the property and water system of the complainant, and which require expenditures in order to preserve the integrity of a water system and the property and water system of complainant. To cover, provide for and compensate complainant for depreciation, obsolescence and other deductions hereinabove stated, to which com-

plainant is legally entitled, complainant will be entitled, during the year from May 1st, 1914 to May 1st, 1915, to an allowance of not less than one hundred and seventy thousand dollars ($170,000.00), which sum is a reasonable amount to provide for the items of expense herein referred to and to preserve the integrity and value of complainant's property and water system.

Twenty-third. It is essential, meet, right, proper and neces-
110 sary to the rights of complainant, present and future that this court, or your honors, by decree, determine the actual and reasonable value of the property and water system of complainant now devoted to, and which will be used during the year from May 1st, 1914 to May 1st, 1915, in, the supplying of water and the rendering of service in connection therewith to defendant, the city and county of Denver and its inhabitants, including its going concern or assembled value, and also what the amount of annual depreciation of the property of complainant by natural use and wear and tear, and reasonable allowance for obsolescence, as well as the amount to which complainant is entitled to replace portions of its property which might be destroyed by extraordinary casualty, and what will be during said year from May 1st, 1914, to May 1st, 1915, a reasonable and just income to it, based upon such values, and what will be a reasonable amount to be allowed for taxes and operating expenses during said year, and what will be the fair value of the services rendered by complainant in the premises for said year beginning May 1st, 1914, and ending May 1st, 1915.

Eliminated by amendment filed May 13, 1914.

Twenty-fourth. Neither the Council of the city and County of Denver, or any of the members thereof, who passed or acted upon Exhibit "A," had any right, power or authority whatsoever to consider, enact or approve said Exhibit
111 "A" under Article XX of the Constitution of the state of Colorado, or of the Charter of defendant, the city and county of Denver, and each and every act and pretended act of said Council, and the members thereof, in reference to said Exhibit "A," is and was at all times of no effect whatsoever. Said Exhibit "A" is null and void and of no force or effect whatsoever because not legally passed or adopted by the Council of the city and county of Denver, or any of the members thereof, having the power to act in the premises, and neither the Council of the city and county of Denver or any of the members thereof, had any right, power or authority to fix or attempt to fix the charges for services rendered and to be rendered by the complainant.

Twenty-fifth. All taxes heretofore paid by complainant, and from year to year, have been the taxes duly and legally assessed against the property of complainant, constituting a lien thereon, and which it was obligated to pay. All expenditures for operations heretofore made by complainant from year to year as herein set forth, are the actual, necessary and reasonable charges incurred in the operation of

the properties and water system of complainant for the purpose of supplying the city and county of Denver and its inhabitants with water.

Twenty-sixth. Under section 4 of Exhibit "A" the defendants herein, and each of them, are threatening to arrest and fine
112 complainant, and any of its officers who may attempt to collect rates other than those set forth in said Exhibit "A", or to do anything contrary to the provisions of Exhibit "A" and unless said defendants are restrained by this Honorable Court from so doing, said defendants will cause the complainant, and its officers, to be arrested and fined in numerous instances and charged with the violation of section 4 of said Exhibit "A".

The enforcement of section 4 of Exhibit "A" will result in a denial to complainant of the equal protection of the laws and render its property liable to be taken without due process of law, because complainant is only allowed a hearing on the claim of the unconstitutionality of Exhibit "A" and the provisions thereof at the risk, if mistaken, of being subjected to enormous, unusual and confiscatory penalties, resulting in the possible confiscation of a large part of its property.

Upon the refusal of any of the inhabitants of the city and county of Denver to pay the fair and reasonable rates charged for water supplied and services rendered to them, complainant will be obliged to begin numerous suits to collect said fair and reasonable rates, and Exhibit "A" and the rates therein provided will be made the excuse and justification by said water consumers for not paying said fair and reasonable rates.

The amount to be collected from each of the forty-four
113 thousand, two hundred and eighty (44,280) consumers taking their water supply from complainant is in most individual instances so small as to preclude the institution of litigation to collect the same, because of the cost involved, and in many instances complainant, having no security for the payment of said water charges, will be unable to effect a collection of the same.

Unless defendants and the inhabitants of the city and county of Denver be, by the orders and decrees of this court restrained from executing and enforcing said Exhibit "A", complainant will suffer great and irreparable injury, and a multiplicity of suits will result. Complainant has no adequate remedy at law for the redress of the injuries which will be inflicted upon it, and its property and officers, by the enforcement, or the attempt to enforce Exhibit "A", and it is necessary to protect the complainant's rights and property that a court of equity shall interfere with its power of preventing injury.

In consideration whereof, and inasmuch as complainant has no plain, speedy and adequate remedy at law in the premises, and can have no adequate relief except in this court, and to the end that defendants, and each of them, may make, if they or he can, full disclosure and discovery of their alleged claims and assertions and rights in the premises, and according to the best and utmost of their memories, knowledge, information and belief, full,
114 true, direct and perfect answer make to the matters hereinbefore stated and charged, complainant has brought this

action and waived verification or affirmation to the answer of defendants. Complainant prays that this court, and your Honors, may decree as follows:

First. That the writ of subpœna may be granted unto complainant, directed to the defendants herein named, to-wit: The city and county of Denver, a corporation; J. M. Perkins, Clair J. Pitcher, Alexander Nisbet, John B. Hunter and Otto F. Thum, as Commissioners, members of and constituting the Council, of the city and county of Denver; J. M. Perkins, as Mayor and Commissioner of Social Welfare of the city and county of Denver; Clair J. Pitcher, as Commissioner of Finance of the city and county of Denver; Alexander Nisbet, as Commissioner of Safety of the city and county of Denver; John B. Hunter as Commissioner of Improvements of the city and county of Denver; Otto F. Thum, as Commissioner of Property of the city and county of Denver; James F. Markey, as Auditor of the city and county of Denver; Armour C. Anderson, Edwin Van Cise and A. Lincoln Fellows, as members of and constituting the Public Utilities Commission of the city and county of Denver, and each of them, thereby commanding them, and each of them, at a certain time and under a certain penalty therein to be named, personally to be
115 and appear before this Honorable Court then and there to answer unto all and singular the matters aforesaid (not under oath or affirmation, all answers under oath or affirmation being hereby expressly waived), according to the practice and rules of this court, and to stand and abide by and perform such orders, directions and decrees as shall be made herein, and as to your Honors shall seem equitable and just.

Second. That said Ordinance No. 26 of the Series of 1914, Exhibit "A", as passed by the council of the city and county of Denver, on March 3rd, 1914, was and is unconstitutional, null and void and of no effect whatsoever, and that all further action thereunder be forever enjoined.

Third. That complainant is entitled to rates for supplying water and rendering service to the city and county of Denver and its inhabitants, for the fiscal year commencing May 1st, 1914, and ending April 30th, 1915, so fixed that they will in the aggregate afford a just, fair and reasonable compensation for the water supplied and services rendered, based upon the value of the property of complainant necessarily used therefor, and that will yield a sufficient annual income to complainant to pay its operating expenses and taxes and an annual sum for depreciation of its property and water system, and for obsolescence, and to provide for the replacement of portions of its property liable to be destroyed by extraordinary
116 casualty, and to realize, in addition a net earning or income in excess of eight per cent. per annum or such other rate as to the court may seem fair and reasonable upon the value of its property and water system in actual use in supplying the said city and county of Denver and its inhabitants with water, and that the value of such property is at least the sum of seventeen million dollars ($17,000,000.00).

Fourth. That defendants and each of them, and all consumers of

water in the city and county of Denver, and the agents, representatives and attorneys of each of them, be, perpetually at the conclusion of this litigation, enjoined from enforcing or attempting to enforce, said Ordinance No. 26 of the Series of 1914, Exhibit "A", and from bringing or causing to be brought, or prosecuting suit or action against the complainant, in law or in equity, to enforce said Exhibit "A", or for any other purpose on account of the failure or refusal of complainant to conform to the rates intended to be prescribed in said Exhibit "A".

Fifth. What the value of the property and water system of complaint is in use, and necessarily in use in supplying water to the city and county of Denver and its inhabitants, including in such value the fact that complainant has an established and going business, and to determine a reasonable and just net income to complainant based upon the value of its property, and what was and

117 is a reasonable amount to allow complainant for taxes on such property, and what were and are reasonable amounts to allow complainant for annual operating expenses and annual depreciation of plant, obsolescence and replacement of portions of its plant liable to be destroyed by extraordinary casualty, and what was and is the reasonable value of the services rendered by complainant to the city and county of Denver and its inhabitants, during a fiscal year.

Sixth. That a preliminary or interlocutory injunction be immediately granted, restraining and enjoining defendants, and each and all of them, and all consumers of water from the water system of complainant, together with their agents, representatives and attorneys, pending this litigation, from enforcing or attempting to enforce said Ordinance No. 26 of the Series of 1914, or any of the terms thereof, or from bringing or causing to be brought, or prosecuting any suit or action against complainant, or any of its officers, agents or representatives, in law or in equity, to enforce said Ordinance No. 26 of the Series of 1914, or for any other purpose, on account of the failure or refusal of complainant to conform to the rates, charges and terms intended by said Ordinance No. 26 of the Series of 1914 to be prescribed, and pending the ordering of said preliminary or interlocutory injunction and the hearing thereon, that a restrain-

118 ing order covering the matters herein prayed for be made.

Seventh. That complainant have such other and further relief as to this court and your Honors may seem right in the premises, together with complainant's costs of suit.

THE DENVER UNION WATER COMPANY,
By W. P. ROBINSON, *President.*
GERALD HUGHES,
CLAYTON C. DORSEY,
Solicitors for Complainant.

STATE OF COLORADO,
City and County of Denver, ss:

W. P. Robinson, of lawful age, being first duly sworn, on his oath, deposes and says:

That he is the President of the complainant, The Denver Union Water Company; that said complainant is a corporation and for that reason he makes this verification in its behalf; that he has read the foregoing bill of complaint and knows the contents thereof; that the same is true of his own knowledge, except as to matters therein stated on information and belief, and as to those he believes it to be true.

W. P. ROBINSON.

Subscribed and sworn to before me this 29th day of April, A. D. 1914. My commission will expire October 31st, 1914.

[NOTARIAL SEAL.] WALTER E. WILMOT,
Notary Public.

119 EXHIBIT "A."

By Authority.

Ordinance No. 26. Series 1914.

Initiated Bill for an Ordinance to Regulate Charges for Water Furnished the City and County of Denver and its Inhabitants by the Denver Union Water Company. While said Company shall Continue so to do, as a Tenant by Sufferance, and to Prohibit Discriminatory Rates and Charges and Provide a Penalty for Violation.

Whereas, The Denver Union Water Company is and has been since April 10, 1910, without a franchise and a mere tenant by sufferance of the streets of the City and County of Denver and has been during said time supplying said City and County and its inhabitants with water for divers uses and purposes, but at rates that are excessive and that should be reduced and regulated accordingly; now therefore.

Without in any manner recognizing said The Denver Union Water Company's right to occupy the streets of the City and County of Denver or to continue its service as a water carrier, but for the purpose of regulating and reducing the charges made by it during the time it shall further act as a water carrier and tenant by sufferance of said streets, to the end that the people may be properly and economically served.

Be it enacted by the Council of the City and County of Denver:

Section 1. That from and after the date of the passage and approval of this ordinance the rates of charge permitted to be made and collected by The Denver Union Water Company for water served, delivered and consumed by the City and County of Denver and the inhabitants thereof, shall be as follows and no more in any event, which shall constitute a schelule of semi-annual water rates payable in advance on the first day of May and November of each year, to-wit:

Alcohol, each barrel manufactured	$.03
Ale cellar, $6.40 to	12.80
Bakery, each oven, $3.20 to	16.00
Barber shop, first chair	2.55
Barber shop, each additional chair	.95
Barber baths, each	4.80
Bath, in private house, with heating apparatus, first bath tub	1.60
Each additional bath tub	.95
Bath private house, without heating apparatus	.65
Bath in boarding or tenement house of 15 rooms, or less	1.60
Bath in boarding or tenement house of over 15 rooms	3.20
Bath, public, hotel, saloon, sporting house, restaurant or club house	3.20
Beer, each barrel brewed	.03
Beer house, $6.40 to	12.80
Beer pump	3.20
Billiard tables, each	.95
Boarding or tenement house, per room	.45
But no less than	3.20
Bookbindery, not less than	3.20
Bowling alley, not less than	3.20
Bottling Works, $8.00 to	12.80
Brick work, per 1,000 kiln count	.06
Brick yard, each gang of hands	6.40
Camphene, each barrel manufactured	.03
Candle manufactory, $16.00 to	160.00
Candy manufactory, $5.20 to	24.00
Church, $1.60 to	4.80
Church, Baptist, for baptistry, $1.60 to	4.80
Cigar manufactory, per hand	.65
But no license less than	3.20
Club room, $9.60 to	32.00
Coffee saloon, $4.80 to	9.60
Confectionery, $4.80 to	19.20
Concrete, per cubic yard	.06
Concrete, per cubic yard, street paving	.04
Cow	.35
Cows, over five head, each	.25
Distillery, each barrel distilled	.03
Dram shop or saloon, $8.00 to	24.00
Dyeing or scouring, $8.00 to	24.00
Forage	.95
Fountain for six months, running not more than four hours per day—	
1 opening, 1-16 inch diameter	9.60
1 opening, ¼ inch diameter	16.00
1 opening, 3-16 inch diameter	25.60
1 opening, ¼ inch diameter	32.00
1 opening, 5-16 inch diameter	38.40
1 opening, ⅜ inch diameter	48.00

1 opening, 7-16 inch diameter	60.00
1 opening, ½ inch diameter	76.00
Fountain, vegetable, $4.80 to	8.00
Fountain, fish, $16.00 to	25.00
Fountain in drug store, opening not to exceed ⅛ inch diameter	25.00
Hall, $1.60 to	9.60
Hat manufactory, $4.80 to	24.00
Horse in private stable	.95
Hose, for livery or sale stable	12.80
Hose for livery stables—	
Not over 25 single stalls	12.80
Over 25 and up to 40 single stalls	16.00
Over 40 and up to 50 single stalls	24.00
Over 50 single stalls	32.00
Hotel, per room	.48
Ice cream saloon, $4.80 to	12.80
Laboratory, $6.40 to	32.00
Laundry, $6.40 to	95.00
Laundry, Chinese, not less than	8.00
Livery stable	.65
Lunch, in saloons, $4.80 to	9.60
Malting, per 100 bushels	.65
Motor for church organ, $8.00 to	12.00
Officers and banks, $1.60 to	9.60
Oyster saloon, $4.80 to	9.60
Packing house, $12.80 to	160.00
Photograph gallery, $6.40 to	12.80
Plastering, per 100 square yards	.32
Porter cellar, $6.40 to	12.80
Rectifying whisky, per 100 barrels	1.95
Residence, occupied by one family only—	
1 to 4 rooms	1 60
5 to 6 rooms	1.90
7 to 8 rooms	2.25
9 to 10 rooms	2.55
11 to 12 rooms	2.90
13 to 14 rooms	3.20
15 to 16 rooms	3.50
17 to 18 rooms	3.75
19 to 20 rooms	4.15
Residence used as boarding house or tenement house, of 10 or more rooms, per room	.48
Residence used as boarding or tenement house of less than 10 rooms	3.20
Rooms in blocks or over business houses	.48
Restaurants, $8.00 to	32.00
Sale stable, per stall	.65
But no license less than	12.80
School, including all uses of water except for boilers, motors and irrigation, for every scholar	.04

Store rooms and shops, $1.60 to	95.00
Store rooms and shops—	
12½ feet front or less	1.60
Over 12½ feet front to 18 feet front	2.50
Over 18 feet front to 25 feet front	3.75
Over 25 feet front to 37½ feet front	4.80
Over 37½ feet front to 50 feet front	6.40
Over 50 feet front, special rates.	
Stores—	
Confectionery store, $4.80 to	12.80
Drug store, $4.80 to	9.60
Liquor store, $4.80 to	9.60
Meat store or butcher shop, $4.80 to	9.60
Saloons, $8.00 to	24.00
Slaughter houses, $8.00 to	160.00
Soap manufactory, $32.00 to	240.00
Soda manufactory, $12.80 to	64.00
Sprinkling and washing pavements or sidewalks where irrigation rates are not paid, per foot run	.06
Starch manufactory, $16.00 to	64.00
Steam boilers, running 24 hours per day, per square foot of fire surface	.12
But no license less than	8.00
Steam boilers, for heating buildings or tenement houses only, per square foot of fire surface	.03
But no license less than	6.40
Steam boilers for heating private residence	3.20
Stock yard, $8.00 to	160.00
Stone work, per perch	.03
Sugar refinery, $96.00 to	960.00
Tannery, per vat	1.90
But no license less than	8.00
Tenement, per room	.48
But no license less than	3.20
Tobacco manufactory, per hand	.65
But no license less than	3.20
Tumbler washer in drug store	25.00
Urinal basin or trough, $1.60 to	6.40
Vault for residence	1.25
Vault, accommodating double house or more than one tenement, each tenant	.95
Vault, for tenement or boarding house, for every 15 rooms or less	1.60
Vault for bar room or saloon	1.60
Vinegar, for each barrel manufactured	.03
Washing bottles, $1.60 to	6.40
Washing barrels, per barrel	.03
Washing meat, $16.00 to	160.00
Washing vehicle in private stable, not less than	1.60
Water closet, private house, first bowl	1.60
Water closet, private house, each additional bowl	.95

Water closet, in boarding or tenement house of 15 rooms or less	1.60
Water closet, in boarding or tenement house of over 15 rooms	3.20
Water closet, in hotel, club room restaurant, saloon, barber shop or sporting house	3.20
Water closet, for use of two or more stores or houses	3.20
Wine cellar, $6.40 to	12.80

Special Rates.

Irrigation of lots, including sidewalks and trees, only through hose with nozzle not to exceed one-quarter of one inch in diameter, to be used only within the hours specified on the license and never during a fire or conflagration, 17½ cents per front foot for the season. Where irrigation is used outside of property lines along the side of irrigated corner lots, the frontage is counted to include one-half lot additional. No license for irrigation will be issued for less than the season rate, from May 1st to November 1st.

Meter Rates.

(Payable Monthly.)

1,000 to 15,000 gals. per month 13½ cents per 1,000 gals.
15,000 to 30,000 gals. per month 12½ cents per 1,000 gals.
30,000 to 60,000 gals. per month 12 cents per 1,000 gals.
60,000 to 150,000 gals. per month 10½ cents per 1,000 gals.
150,000 to 315,000 gals. per month 9½ cents per 1,000 gals.
315,000 to 637,500 gals. per month 9 cents per 1,000 gals.
637,500 to 1,500,000 gals. or over per month 8 cents per 1,000 gals.
City for any purposes 6 cents per 1,000 gals.
Minimum meter rate for business premises, $2.40 per month.
Minimum meter rate for residence, 20 cents per month.

Where water is paid for all purposes on premises there will be no additional charge for a stand pipe for fire protection.

Where The Denver Union Water Company's water is not used, a special rate will be made for such stand pipes, to be reasonable as construed with the foregoing.

No charge to be made for premises vacant for a space of two weeks or more; no charge for readiness to serve on any account; no discriminatory or preference rates to be given any consumer on any account whatever.

The Denver Union Water Company shall within thirty days after demand, upon payment of the cost thereof, install a meter for any person desirous of using water from said company by meter.

Section 2. For every hydrant now set and in commission, and for those which may thereafter be ordered by the Council to be set upon existing mains or upon extensions thereof, the City and County shall

pay to said Company the sum of eighteen dollars per annum, one-half the first day of May and one-half the first day of November of each calendar year, provided said hydrant rental shall include all water consumed or needed by the City for the following purposes. In court house, city hall and fire department houses, for flushing of sewers and gutters and for sprinkling of streets and washing of streets and sidewalks.

Section 3. That all charges against vacant houses and stores during periods of vacancy, also readiness to serve charges or emergency charges, and all discriminatory or preference charges of any and every kind whatever, be and the same are hereby prohibited.

Section 4. If said The Denver Union Water Company, or any of its officers, servants or agents, shall violate any of the provisions of this ordinance, the company or person so violating the same shall be deemed guilty of a misdemeanor, and, on conviction thereof, shall be punished by a fine or not less than one hundred dollars and not more than three hundred dollars.

Signed by me this 3rd day of March, A. D. 1914.

J. M. PERKINS, *Mayor.*

Attested by the undersigned with the corporate seal of the City and County of Denver.

[SEAL.] OTTO F. THUM,
Commissioner of Property, ex-Officio Clerk of the City and County of Denver.
By C. J. MOORHOUSE,
Deputy Clerk.

Published in The Denver Times this 5th day of March, A. D. 1914.

120 (Endorsed:) 6274. In the U. S. District Court, District of Colorado. In Equity. No. 6274. The Denver Union Water Company, a corporation, complainant, vs. The city and county of Denver, a corporation, et al., defendants. Bill of Complaint. Filed Apr. 29, 1914. Charles W. Bishop, Clerk. Gerald Hughes, Clayton C. Dorsey, Solicitors for complainant.

In the District Court of the United States within and for the District of Colorado.

In Equity. No. 6274.

THE DENVER UNION WATER COMPANY, a Corporation, Complainant,
v.
THE CITY AND COUNTY OF DENVER, a Corporation, et al., Defendants.

Amendment to Bill of Complaint.

Now comes the complainant above named, and pursuant to Equity Rule 28, amends its bill of complaint heretofore filed herein, by

eliminating and omitting therefrom all of paragraph "twenty-fourth" now appearing at page 54 of said bill on file in the Clerk's office.

C. C. DORSEY
GERALD HUGHES,
Solicitors for Complainant.

(Endorsed:) Court No. 6274. Div. In Equity. In the U. S. District Court, for the district of Colorado. The Denver Union Water Company, a corporation, Plaintiff, vs. The City and County of Denver, a corporation, et al., Defendant. Amendment to Bill of Complaint. Filed May 13, 1914, Charles W. Bishop, Clerk.
121 Hughes & Dorsey, Attorneys for complainant. No. —.

In the District Court of the United States within and for the District of Colorado.

No. 6274.

THE DENVER UNION WATER COMPANY, a Corporation, Complainant,
vs.
THE CITY AND COUNTY OF DENVER, a Corporation; J. M. PERKINS, Clair J. Pitcher, Alexander Nisbet, John B. Hunter, and Otto F. Thum, as Commissioners, Members of and Constituting the Council, of the City and County of Denver; J. M. Perkins, as Mayor and Commissioner of Social Welfare of the City and County of Denver; Clair J. Pitcher, as Commissioner of Finance of the City and County of Denver; Alexander Nisbet, as Commissioner of Safety of the City and County of Denver; John B. Hunter, as Commissioner of Improvements of the City and County of Denver; Otto F. Thum, as Commissioner of Property of the City and County of Denver; James F. Markey, as Auditor of the City and County of Denver; Armour C. Anderson, Edwin Van Cise and A. Lincoln Fellows, as Members of and Constituting the Public Utilities Commission of the City and County of Denver, Defendants.

Answer.

122 Come now the defendants in the above-entitled cause, by Isaac N. Stevens, George Q. Richmond, T. M. Patterson and George L. Nye, their attorneys, and for their joint and several answer to the bill of complaint in said cause, say:

First. That said bill of complaint does not state facts sufficient to constitute a cause of action within the jurisdiction of this court, in that it appears from said bill of complaint that the parties to this cause, complainant and defendant, are citizens and residents of the state of Colorado, the corporate defendants being duly organized and existing under and by virtue of the laws of the State of Colorado, and being citizens and residents of said state, and that it is not made further to appear by the facts alleged in said bill that there is a federal question involved herein.

Second. That the said bill of complaint does not state facts sufficient to entitle the complainant to the relief demanded, or to any relief whatever.

Wherefore, these defendants pray that said bill of complaint be dismissed, and for their costs in this behalf expended.

Second Defense.

Further answering, these defendants jointly and severally say:

First. Defendants admit that complainant is a corporation duly incorporated under the laws of the State of Colorado,
123 but as to whether complainant has fully complied with the laws of the State of Colorado, and is now authorized and empowered to acquire, construct, extend, own, maintain and operate water-works for and to engage in the business of supplying water to the City and County of Denver and its inhabitants for all or any uses and purposes, and to take tolls and rates therefor, and to acquire, own, maintain and operate such property as may be necessary or convenient, these defendants have not and cannot obtain sufficient knowledge or information upon which to base a belief. These defendants deny that complainant is entitled by right or otherwise to maintain and operate in the roads, streets, alleys and public places of the City and County of Denver, its pipes, mains, conduits and other apparatus constituting its plant and system for the supplying of water to and in said City and County of Denver; but these defendants admit that complainant was so authorized prior to the tenth day of April, 1910, and that since said date complainant has continued so to occupy and use said streets and public ways, but solely by sufferance and without right so to do.

Second. These defendants admit that the City and County of Denver is a municipal corporation, existing under and by virtue of Article XX of the Constitution of the State of Colorado; that J. M. Perkins, as Mayor and Commissioner of Social Welfare, Clair
124 J. Pitcher, as Commissioner of Finance, Alexander Nisbet, as Commissioner of Safety, John E. Hunter, as Commissioner of Improvements, and Otto F. Thum, as Commissioner of Property, are the commissioners, members of and constituting the council of the City and County of Denver; that James F. Markey is Auditor of said City and County, and that Armour C. Anderson, Edwin Van Cise and A. Lincoln Fellows, are members of and constitute the Public Utilities Commission of said City and County, and each and all of said individuals are residents and citizens of the City and County of Denver, State of Colorado.

Third. Defendants admit that this is a suit of a civil nature, in equity, involving more than the sum of five thousand dollars ($5,000.00), but deny that the controversy herein arises under the Constitution and laws of the United States, or that said Constitution and laws are in any manner involved.

Fourth. These defendants admit that complainant is a Colorado corporation, with an authorized capital as stated in the bill of complaint herein, and that said complainant is the successor in interest

of the various corporations in paragraph four of said bill of complaint alleged and set forth, and the owner of property theretofore owned by said companies, except that these defendants deny that the complainant or its predecessors in interest, or any of them, are
125 or were the owners of water rights or rights to the water supplied to the City and County of Denver and its inhabitants through the physical structures owned by said complainant or its predecessors in interest. These defendants admit the making, execution and delivery by the complainant of the mortgage or deed of trust set forth and described in paragraph four of complainant's bill of complaint, and the recording thereof, but as to whether all of the eight million dollars of bonds secured by said deed of trust are now outstanding in the hands of bona-fide purchasers for value, and as to whether since the organization of complainant, complainant has paid and distributed only the dividends set forth and described in paragraph four of complainant's complaint, or as to whether, with the exception of the dividends there described all of the net earnings and surplus of complainant earned and accumulated during its existence have been used and devoted to the purchasing and acquiring of additional property, to the extension, improvement and betterment of the water system owned by complainant and used for supplying the City and County of Denver and its inhabitants with water, and for the protection and preservation of said properties and the business of complainant, these defendants have not and cannot obtain sufficient knowledge or information upon which to base a belief.

Fifth. These defendants admit that the City and County of Den-
ver is a municipal corporation, having a charter which pro-
126 vides for a commission form of government, under which the powers and duties of the legislative, executive and administrative departments are exercised by a board of five commissioners, and that defendants Perkins, Pitcher, Nisbet, Hunter and Thum are the duly elected, qualified and acting Commissioners of said City and County of Denver; that James F. Markey is the duly elected, qualified and acting Auditor of said city and county; that Armour C. Anderson, Edwin Van Cise and A. Lincoln Fellows are the duly elected, qualified and acting members of the Public Utilities Commission, which commission derives its powers from and is now acting under Section 264-A of the Charter of the City and County of Denver. Defendants further admit that under Article XX of the Constitution of the State of Colorado, the City and County of Denver is the legal successor of the City of Denver and towns of Barnum, Colfax, Harmon, Highlands, South Denver, Argo, Berkley, Elyria, Globeville, Montclair and Valverde, and embraces within its exterior boundaries all of the territory formerly embraced in each of said municipalities, including approximately 37,920 acres.

Sixth. These defendants admit that in 1870 The Denver City Water Company began the construction of a water-works system to supply the City of Denver and its inhabitants with water; that prior to the organization of The Denver Union Water Company in 1894
and the acquirement by it of the properties of its grantor
127 companies, said companies had constructed water systems for supplying the City and County of Denver with water; that

upon the organization of complainant in 1894 it united said water systems into one system, which since said times has been operated as a unit, and has been and is now the principal source of actual supply of water for all purposes for the City and County of Denver and its inhabitants; but these defendants deny that said system is the only source from which the said City and County of Denver and its inhabitants can be supplied with water. These defendants admit that in 1870 the City of Denver had a population of approximately 4,759 persons, and that the population has increased substantially as in complainant's bill of complaint alleged; that the commercial, financial and material growth of said city has increased correspondingly to its increase in population, and that the demands on the complainant and its grantor companies likewise increased in connection with the supplying of water to said City and County of Denver and its inhabitants. These defendants admit that complainant and its grantor companies from time to time since 1870 have added to their properties and expanded the said water system, and have expended large sums of money thereon. These defendants deny that at the present time and for some years last past the properties of complainant constitute an efficient water supply for the City and
128 County of Denver and its inhabitants; and as to whether said system embraces every element of structure and equipment found in any water system, together with additional important elements necessitated by peculiar local conditions, as alleged, these defendants have not and cannot obtain sufficient knowledge or information upon which to base a belief. These defendants admit that complainant, or its grantors, have constructed large reservoirs, capable of impounding sufficient water to meet the present requirements of the City and County of Denver, but these defendants deny that said reservoirs are sufficient to meet the demands or requirements of the City and County of Denver and its inhabitants, reasonable or otherwise, in the immediate future without replenishing and without aid from other sources. These defendants admit that complainant and its grantors have in various ways acquired certain water rights and rights for the carriage of water by appropriation and purchase; that some of said rights were early rights to water that can be advantageously used for a water supply for the City and County of Denver; but these defendants deny that the complainant or its grantors have ever at any time, by use or consumption, initiated, held or owned any of the water or water rights claimed by complainant, and allege that at all times complainant has served but as a carrier of the water supply of the City and County of Denver and its inhabitants and that the right to and ownership of all water rights and
129 rights to water carried through the system and pipes of complainant company have belonged to and are now vested in the City and County of Denver and its inhabitants. These defendants deny that by the operations and efforts of complainant there has been developed a water supply ample for all the needs and requirements of the City and County of Denver and its inhabitants, with rights perfected for use all the year around instead of for the crop growing season, as in case of irrigation rights; deny that such rights are

such magnitude as to control during a considerable portion of every year all the water flowing in the streams above Denver in the non-irrigating season, but these defendants allege that all efforts of complainant and its grantors and predecessors in interest would have proved futile and of no avail except for the use and consumption of the water flowing in the pipes and system of complainant by the City and County of Denver and its inhabitants. These defendants admit that the supply of water carried through the system of complainant is diverted at six separate and distinct locations on the South Platte River, Bear Creek and Cherry Creek, at distances ranging from three to forty-eight miles from the city, and that the principal physical properties of the water system referred to are as in paragraph six of complainant's bill of complaint described in a general way. These defendants admit that the city and county of Denver is located
130 in a semi-arid region at the eastern base of the Rocky Mountains, and that it is more or less dependent for its water supply upon the small mountain streams which flow through or near it, but defendants deny that the City and County of Denver and its inhabitants are solely dependent upon such streams as a source of water supply. These defendants admit that the agricultural regions surrounding and adjacent to said City and County are more or less dependent upon the water from said mountain streams as a source of irrigation and in connection with the raising of crops, and that as the population of the City and County of Denver has increased and the population of the surrounding and adjacent country has increased, the demand for water has correspondingly increased, until a considerable portion of the water flowing eastward from the Rocky Mountains in and around the City of Denver has been appropriated and has been and is being used for domestic and irrigation purposes; but these defendants deny that all of such water has been so appropriated, and deny that the City and County of Denver has not now and never has had any source of water supply for itself and its inhabitants, but allege that the said City and County now owns, and for many years last past has owned, a considerable water supply, capable of supplying a substantial part if not all of the demands of said City and County and its inhabitants for water; but these defendants
131 admit that said City and County has not at the present time any plant or system capable of distributing said water to said city and county and its inhabitants, but allege that said city and county and its inhabitants have determined and are proceeding as speedily as may be to construct a water plant and system capable of distributing said water and other waters to and adequately supplying said City and County of Denver and its inhabitants with water.

Seventh. Defendants admit that since the formation of complainant in 1894 much of the property acquired from its grantor companies, together with additions, extensions, betterments and improvements thereto, has been devoted to the necessary and actual use of supplying defendant the City and County of Denver and its inhabitants with water for all purposes, and that complainant has constantly and from time to time added to its properties and water system, but deny that complainant has at all times added to its properties and

water system as the needs of defendant the City and County of Denver and its inhabitants have manifested themselves, and deny that all of complainant's property has been or is devoted solely to the actual and necessary use of supplying the defendant City and County of Denver and its inhabitants with water. These defendants admit that complainant acquired from The Denver Water Company a certain franchise known as Ordinance No. 44 of 1890, which entitled
132 said Denver Water Company and its assigns to occupy the streets and public ways of the City of Denver to supply said city and its inhabitants with water, and to charge for such services a certain schedule of rates set forth in said ordinance; but these defendants deny that the charges permitted by said ordinance, or made or collected by complainant or its predecessors in interest, were for the water furnished, but on the contrary these defendants allege that such charges were permitted, were made, and paid by the defendant City and County of Denver and its inhabitants for the service rendered by complainant and its predecessors in interest as carriers or conveyors of the water theretofore, then, and ever since owned by said City and County of Denver and its inhabitants, as the ultimate consumers and users thereof. These defendants admit that the charges fixed by Ordinance No. 44 of 1890 were continued until April 10th, 1910, and until, in a suit in the circuit court of the United States for the District of Colorado, entitled The New York Trust Company against The City and County of Denver, et al., No. 5572 in equity, all rights and privileges of complainant under said ordinance were held to have terminated.

Eighth. These defendants admit that Schedule "A" as fixed in said Ordinance No. 44 of 1890 was the basis of rates charged and collected for said water service from the time of its enactment
133 until 1895, when the schedule known as the Leaflet Schedule, making a horizontal reduction in said rates, was put into effect, which said Leaflet Schedule was in effect from 1895 to and including the year 1913, except for the years 1898 to 1907, during which time rates in excess thereof were charged and collected by complainant claiming to act under and by virtue of the authority of a certain decree entered in the District Court of the State of Colorado for the Second Judicial District, in a cause entitled The City of Denver against The Denver Union Water Company, being cause No. 26251 in said court. Defendants admit that Ordinance No. 44 of 1890 provided certain charges for hydrants, and that complainant has collected and the City and County of Denver has paid for the use of such hydrants for the years 1891 to 1913, inclusive, as in said ordinance provided; and these defendants admit that the payments for 1910, 1911, 1912, 1913 and 1914 have been accepted by complainant with an attempted reservation upon the part of complainant of a right to claim an additional rate per hydrant; but these defendants deny that said attempted reservation was in any manner or at all effectual, and allege that complainant has at all times and in all years been fully paid by the City and County of Denver for all five hydrants and the water service thereto rendered by the complainant.

Ninth. These defendants admit that water is a commodity hav-

ing an ascertained value in the City and County of Denver,
134 and State of Colorado, and that such value increases as uses therefor increase, and admit that for many years it has been necessary that the needs of defendant City and County of Denver for water should be anticipated, and that the supply of water capable of being furnished to said City and County of Denver and its inhabitants should be several years in advance of the actual present need, and that without such anticipation future growth of the City and County of Denver would be impeded; but these defendants deny that such need has been anticipated or provided for by complainant. Defendants admit that at certain periods of the year all of the natural flow of the streams supplying water to the City and County of Denver is not sufficient to supply the daily consumption of water in said City and County of Denver; but these defendants deny that such deficiency is equal to one-half the daily consumption of water in said City and County. These defendants admit that it is and has been and now is essential, in order to supply the City and County of Denver and its inhabitants with water, and protect the health and safety of said inhabitants, that large storage reservoirs should be built and maintained on the headwaters of the streams above Denver, and admit that complainant has constructed, or caused to be constructed, some such reservoirs, but these defendants deny that the reservoirs constructed by complainant are adequate or sufficient
135 for the needs of the City and County of Denver and its inhabitants, and deny that the reservoirs constructed by complainant cannot now be duplicated upon the streams above said city and county. These defendants admit the incorporation of The South Platte Canal and Reservoir Company, and that complainant owns all of the capital stock of said company. These defendants admit that The South Platte Canal and Reservoir Company, acting under the control of complainant, and by the expenditure of money obtained and furnished by complainant, constructed a dam and created a reservoir known and designated as the Cheesman Lake and Dam, on the south fork of the South Platte River, approximately forty-eight miles from the City and County of Denver, and admit that said Lake and dam has been used and is necessary to be used until the construction of another reservoir or reservoirs to take its place as a storage reservoir or reservoirs to impound and store water for supplying the city and county of Denver and its inhabitants with water; but as to the amount of water now contained in said lake and dam, and whether the amount thereof is sufficient to meet the demands of the city and county of Denver and its inhabitants, to permit of its future growth, and protect the health and safety of said city and its inhabitants, these defendants have not and cannot obtain sufficient knowledge or information upon which to base
136 a belief. These defendants admit the construction of Cheesman Lake and Dam at the point and substantially in the manner alleged and set forth in complainant's bill of complaint, and that the area of said reservoir, and the acres included therein and surrounding said reservoir, controlled by complainant, are substantially as alleged in complainant's bill of complaint. These defend-

ants admit that The South Platte Canal and Reservoir Company authorized and issued $4,000,000.00 of bonds, secured by a trust deed running to Morton Trust Company of New York, and covering all of its property acquired and to be acquired, and that complainant guaranteed the payment of both principal and interest of said bonds; but as to whether or not said bonds have heretofore been issued and sold, and in good faith purchased, and are now outstanding in the hands of purchasers for value, these defendants have not and cannot obtain sufficient knowledge or information upon which to base a belief. These defendants admit that on May 1st, 1903, The South Platte Canal and Reservoir Company entered into an agreement of lease with the complainant substantially as in paragraph nine of complainant's bill of complaint set forth, but these defendants deny that then or now The South Platte Canal and Reservoir Company owned any of the waters carried through its system or the system of complainant. These defendants admit that the property of

137 The South Platte Canal and Reservoir Company leased to complainant, except the water attempted to be leased to complainant, has been ever since the date of said lease in the possession and control of complainant, and that the same is an essential and integral part of the water-works system of complainant devoted to supplying the City and County of Denver and its inhabitants with water, and that under said lease complainant was obligated to operate and maintain the properties by it leased, and to pay all operating costs, taxes and interest on bonds of said South Platte Canal and Reservoir Company. Defendants admit that the properties of the South Platte Canal and Reservoir Company are operated and used as a unit with complainant's property, but as to whether the obligations contained in said lease have been performed by complainant these defendants have not and cannot obtain sufficient knowledge or information upon which to base a belief.

Tenth. These defendants admit that in October, 1907, Ordinance No. 163 of the series of 1907 was enacted, approved and published as an ordinance of the City and County of Denver, and these defendants admit that thereafter appraisers were appointed substantially as in complainant's bill of complaint alleged, and that said appraisers proceeded to appraise said property, and thereafter made a report of their said appraisement substantially as alleged and set forth in complainant's complaint.

Eleventh. These defendants say that as to the allegations

138 in paragraph eleven of complainant's bill of complaint concerning the expenditures of complainant for betterments, improvements, extensions and additions to its properties and water system since October 20th, 1907, these defendants have not and cannot obtain sufficient knowledge or information upon which to base a belief. Defendants further say that as to the allegation that the expenditures made and claimed to have been made by complainant represented the actual and reasonable cost and value of the betterments, improvements, extensions and additions made, these defendants have not and cannot obtain sufficient knowledge or information upon which to base a belief. These defendants admit

that such betterments, improvements, extensions and additions as have been made were necessary and proper, but these defendants allege that the water system and plant of complainant is still inadequate to furnish the proper, sufficient and necessary water supply to the City and County of Denver and its inhabitants.

Twelfth. These defendants admit that prior to April 10th, pursuant to and in accordance with the provisions of Article XX of the Constitution of the State of Colorado and the Charter of the City and County of Denver, complainant prepared and caused to be submitted to the tax-paying electors of the City and County of Denver, at the general election held May 17th, 1910, a proposed franchise and cont-act to be entered into between complainant
139 and defendant the City and County of Denver for a continuance of the relation between complainant and the city and county of Denver and the supplying of water by complainant to the City and County of Denver and its inhabitants, which said proposed ordinance and franchise was defeated and rejected by defendant the City and County of Denver at said election; but these defendants deny that said ordinance provided, upon reasonable and fair terms, for a continuance of said relation between complainant and the City and County of Denver, and allege that the terms of said ordinance proposed by complainant were unreasonable, unfair, unjust and oppressive. These defendants admit that at the same election there was submitted to the voters a proposition for defendant the City and County of Denver to purchase the water system and property of complainant upon a new appraisement, which proposition was likewise defeated and rejected. These defendants admit that at the same election, and subsequent to the appraisement of $14,400,000.00 fixed by said appraisers, there was initiated and submitted to the voters of defendant the City and County of Denver Section 264-A of the Charter, creating a Public Utilities Commission, composed of defendants Anderson, Van Cise and Fellows, and providing for an offer of $7,000,000.00 for the property of complainant, and that in case such offer should not be accepted steps should be taken to construct and build a complete competitive
140 water system at a cost of not to exceed $8,000,000.00, and that said charter amendment known as Section 264-A was adopted at said election.

Defendants admit that at a special election held in the City and County of Denver on February 17th, 1914, there was submitted to the electors and tax-paying electors of defendant city a contract to purchase substantially as in complainant's bill of complaint set forth, but these defendants deny that the profit-sharing basis proposed in said contract would have yielded to complainant far less than a reasonable return upon the reasonable and actual value of its properties, and defendants admit that said proposed contract to purchase was rejected and defeated at said election. These defendants admit that at various times since April 10th, 1910, complainant has offered to sell its properties and water system, together with betterments, extensions, improvements and additions thereto, at a price to be fixed by appraisement, but these defendants say that

as to the defendants constituting the Public Utilities Commission they have at all times been without right or authority to consider the purchase of complainant's water system except upon the terms fixed by the provisions of Section 264-A which created said Commission, and as to the defendant the City and County of Denver these defendants say that each and every proposition properly presented by complainant has been in due course submitted to
141 the electors of the City and County of Denver as required by law, and that said electors have rejected such propositions, as they had a perfect right to do. These defendants admit that they have made no attempt to acquire the properties and water system of complainant, except the attempt and offer authorized by Section 264-A and that they have made no attempt to grant for a definite time a contract or franchise to complainant for further supplying water to the City and County of Denver and its inhabitants, and these defendants allege and say that the offer authorized by the terms of Section 264-A was submitted to the complainant by the Public Utilities Commission, and was by complainant refused; that various propositions acceptable to complainant have been submitted to the qualified electors of the City and County of Denver since April 10th, 1910, and each of such propositions so submitted have been rejected by said electors, and that these defendants individually and collectively have not been and are not now under any obligation, legal or equitable, to grant to complainant a contract or franchise for any purpose. These defendants admit that complainant has since April 10th, 1910, continued to serve the City and County of Denver and its inhabitants with water, but these defendants allege that complainant has at all times since April 10th, 1910, charged and collected for the water service rendered by it at least the amount theretofore charged and collected, and allege that complainant has received and is receiving all
142 and more than that which as a carrier of water it is entitled to receive for the services which it has rendered and is rendering. These defendants deny that the inhabitants of the City and County of Denver have no source of water supply for themselves other than the supply furnished through complainant's system, which supply of water these defendants allege is the property of the City and County of Denver and its inhabitants by virtue of their appropriation, long continued use, and consumption thereof, and these defendant deny that the City and County of Denver *has* no plans or specifications for the construction of a complete and independent water system as proposed under Section 264-A of the Charter, and deny that they have no water or water rights even partially adequate for the purpose of supplying the City and County of Denver and its inhabitants with water. These defendants deny that a complete and independent water system for the City and County of Denver cannot be constructed in less than seven years, but these defendants admit that during the construction of a new system the City and County of Denver and its inhabitants will be dependent for the delivery of their water supply upon the water system of complainant. Defendants admit that every offer of com-

plainant to sell its properties and water system to the City and County of Denver has by said city and county been rejected, and that every suggestion of complainant for a contract or fran-
143 chise has likewise been rejected; but these defendants deny that such offers and suggestions have been fair and reasonable in terms, and allege that each and every such offer and suggestion has been unfair, unreasonable and at excessive prices, and upon terms wholly unsatisfactory to the electors of the City and County of Denver, with whom lies the right for final determination of such questions. These defendants deny that they have threatened or are threatening to destroy all or any part of the property of complainant and its value, or to require complainant to continue to devote its property and water system to supplying defendant the City and County of Denver and its inhabitants with water at rates and charges and upon terms which will not yield a fair and reasonable return upon the actual value of the property of complainant, and allege that the rates and charges fixed by ordinance of the City and County of Denver, duly passed and adopted, known as Ordinance No. 26, 1914, are fair, reasonable, just, and will produce for complainant a fair, reasonable and adequate return upon the capital actually invested by complainant in its water system and carrying service.

Thirteen. Defendants admit that water rates and charges under the leaflet schedule and the schedules prior thereto have been payable in advance semi-annually on the first days of May and No-
144 vember, and that the fiscal year of complainant begins on the first day of November in each year. Defendants admit that complainant has been and is serving approximately 44,280 water consumers, who receive their entire supply through complainant's system, and that in the year May 1st, 1914, to May 1st, 1915, the number of water consumers will be approximately the same. As to the allegations in paragraph thirteen of complainant's bill of complaint concerning the financial operations of complainant, its gross earnings, operating expenses, taxes, net income, etc., as therein set forth, and as to the allowances made or which should be made for depreciation, obsolescence or unusual contingencies, these defendants have not and cannot obtain sufficient knowledge or information upon which to base a belief.

Fourteenth. These defendants admit that the quantities of water furnished and delivered through complainant's system in the years 1908 to 1913, inclusive, were substantially as in paragraph fourteen of complainant's bill of complaint set forth, and that the amount of water to be consumed during the year May 1st, 1914, to May 1st, 1915, and supplied through complainant's system, will be approximately as in said paragraph set forth.

Fifteenth. These defendants deny that neither the defendant the City and County of Denver nor the Public Utilities Commission prior to August 11th, 1913, made any attempt to investigate
145 or value the properties and water system of complainant, but admit that no such attempt was made through a commission of engineers until on or about the 11th day of August, 1913. De-

fendants admit that on August 11th, 1913, defendants the City and County of Denver and the Public Utilities Commission appointed A. Lincoln Fellows, C. P. Allen and Edmond C. Van Diest as a commission to inspect, examine and report upon the properties and water system of complainant, and that said engineers were engaged upon their report until January 14th, 1914, at which time they presented a report, extracts from which report are as set forth in paragraph fifteen of complainant's bill of complaint; but these defendants deny that said report was not submitted until after said Public Utilities Commission had requested said three engineers to eliminate from their said report certain statements and valuations more favorable to complainant and its properties than those contained in said report as filed, and deny that any such request was made by said commission at any time or at all. These defendants admit that water and water rights claimed by complainant and used in supplying defendant the City and County of Denver and its inhabitants with water were omitted by said engineers in their appraisement, and allege that said water and water rights were so omitted because said water and water rights belonging to the City and County of Denver and its inhabitants as the users and consumers thereof. These
146 defendants deny that there is any "going concern value" which is an integral and necessary part of the unit value of the water system of complainant amounting to not less than fifteen per cent of the total value of the physical properties of complainant and the water rights claimed by it, or amounting to any sum or value whatever which forms any part or portion of the unit value of complainant's system, but admit that no "going concern value" was included by said engineers in said report. Defendants admit that in the investigation, inspection and work of said engineers complainant afforded the said engineers every reasonable opportunity for inspection and examination of its records and data, and that the inspection and examination made by said engineers was ex parte; but these defendants deny that if opportunity had been afforded to complainant to present testimony, data, information or argument on its behalf the valuation placed upon the water system of complainant by said engineers would have approximated the appraised value fixed by the appraisers appointed by the complainant *had* the City and County of Denver in 1907, and allege that said engineers by reason of the opportunity afforded them by complainant and all knowledge or information bearing upon the subject under their investigation, and that the report made by them was based upon such a knowledge and information. That as to the allegations in paragraph fifteen of complainant's bill of complaint concerning its employment of
147 George G. Anderson and Leonard P. Metcalf as engineers, its reasons therefor, and the result of the investigation and appraisement of such engineers, these defendants have not and cannot obtain sufficient knowledge or information upon which to base a belief.

Sixteenth. These defendants admit the preparation of a bill for an ordinance and the passage of Ordinance No. 26 of the Series of 1914, a copy of which is attached to complainant's bill of complaint as

Exhibit "A", and that said bill for an ordinance was prepared and said ordinance enacted without consultation or conference with complainant; but these defendants deny that said ordinance was passed without notice to complainant or without opportunity afforded to be heard in reference to the matters therein contained, and the effect thereof on the income and properties of complainant, and allege that said ordinance was regularly initiated by the people under the terms of the Charter of the City and County of Denver and subsequently duly and regularly adopted by the Council of the City and County of Denver and regularly and duly published, with every opportunity allowed or provided by law for any party in interest, including complainant, to protest or contest the same. These defendants deny that neither the City and County of Denver, the Public Utilities Commission or any member thereof, or the Council of the City and County of Denver, or any member thereof, attempted
148 prior to the enactment of said ordinance to investigate the fairness or justice of the rates therein provided, or the effect thereof upon the income or properties of complainant, and allege that each and all of said defendants duly and fully investigated and considered the rates therein provided and the effect thereof, and after full and due consideration determined that said rates were reasonable, fair and just, and these defendants allege that the rates and terms of said ordinance are fair, reasonable and just, and provide a reasonable and adequate return to complainant upon the capital actually invested by it in its carrying system. These defendants deny that said ordinance was conceived, prepared, drafted and enacted without reference to the fairness of the rates therein prescribed, or the effect upon the properties and income of complainant, but for the purpose of crippling and hampering complainant in the operation of its water system, and to depreciate the earning capacity and value of the properties and water system of complainant, in order to enable the defendant the City and County of Denver and said Public Utilities Commission to purchase and acquire the properties of complainant at less than their fair, actual, present value, or for the purpose of in any manner crippling and hampering complainant in the operation of its water system, or in any manner or at all, or to depreciate the legitimate earning capacity and value of the properties and
149 water system of complainant, or to in any manner depreciate the legitimate value of such properties and water system to enable the defendants the City and County of Denver and the Public Utilities Commission to purchase and acquire the properties of complainant at less than their fair, actual, present value, or to enable them to purchase said properties at any price or at all. These defendants admit that the schedule of rates set forth in said exhibit "A" follows generally the items and form of Schedule "A" and the Leaflet Schedule, and that the declared purpose in the enactment of said Exhibit "A" was to reduce the rates under said Leaflet Schedule twenty per cent horizontally.

Seventeenth. These defendants deny that Exhibit "A" reduces the charges to be made by complainant and the gross earnings to be derived thereunder in excess of twenty-one per cent, but admit that

Exhibit "A" requires that certain water service shall be supplied by complainant to defendant the City and County of Denver without charge, and allege that such water service is reasonable, and constitutes a reasonable, just and fair charge upon the complainant for its temporary use and occupancy of the streets and public ways of the City and County of Denver, used and to be used by it in serving water to the City and County of Denver and its inhabitants, for which complainant will receive large revenues. Defendants deny that $18.00 per year for every fire hydrant is less than the reasonable and
150 fair charge for hydrant service, and allege that said sum of $18.00 per year is a reasonable and fair charge and a just and a reasonable compensation to complainant for fire hydrant service.

Eighteenth. Defendants deny that if Exhibit "A" is enforced against complainant the gross earnings of complainant for the year May 1st, 1914, to May 1st, 1915, will be more than $289,215.00 less than for the fiscal year 1913, and that said sum will likewise constitute a reduction in net income of complainant. That as to the allegation that under Exhibit "A" the result of the operation of the properties of complainant for the year May 1st, 1914, to May 1st, 1915, will be as in paragraph eighteen of complainant's bill of complaint alleged, these defendants have not and cannot obtain sufficient knowledge or information upon which to base a belief; but these defendants deny that the sum of $170,000.00 per year is a reasonable allowance for actual depreciation and obsolescence upon the water system of complainant. Defendants deny that under Exhibit "A" and the rates, charges and terms fixed therein, if the same is enforced, the net earnings of complainant for the year May 1st, 1914 to May 1st, 1915, will return to the complainant less than 2.88 per cent upon the present actual value of the properties and water system of complainant used in supplying the City and County of Denver and its inhabitants with water for all purposes during said time.
151 and defendants allege that the net earnings to complainant under Exhibit "A" upon the present actual value of the properties and water system of complainant will be far in excess of said percentage of 2.88 per cent.

Nineteenth. Defendants admit that they have declared and are declaring their purpose of enforcing the terms and provisions of Exhibit "A", and that defendants and the inhabitants of the City and County of Denver will, unless restrained and prevented by order of court, refuse to pay to complainant any charges for water other than those fixed in said Exhibit "A", and allege that said Exhibit "A" is in all respects a valid subsisting ordinance, duly and regularly passed by the properly constituted authorities, and governs and fixes the rates and charges which complainant is entitled to demand and receive for the water service therein referred to and provided for.

Twentieth. Defendants admit that the fifth and fourteenth amendments to the Constitution of the United States provide substantially as in paragraph twenty of complainants' bill of complaint alleged and set forth; but these defendants deny that this pending case is a cause arising in equity under the Constitution of the United States, and

deny that the judicial power of this Honorable Court extends to and embraces the issues made and attempted to be made in this
152 cause, and deny that the issues set forth and attempted to be set forth in complainant's bill of complaint involve a federal question under the Constitution of the United States. These defendants deny that by reason of the acts, facts and things alleged in complainant's bill of complaint, or by reason of any acts, facts or things, the rates provided in Exhibit "A" are unreasonable, unjust, fraudulent, confiscatory, ambiguous, uncertain and unintelligible, and if enforced will compel complainant to conduct its business and operations without fair remuneration, and as to certain portions of said business and operations, a supplying of water without any remuneration or compensation. Defendants deny that said rates and terms as provided in Exhibit "A" are violative of and prohibited by each and all of the said provisions of the Constitution of the United States, and deny that by reason of and under said provisions, or in any manner, or at all, said rates and terms are null and void. Defendants deny that under Exhibit "A" complainant will be compelled to furnish water to defendant the City and County of Denver and its inhabitants at less than the fair, reasonable and just value of the services rendered, and deny that by the enforcement of the rates and terms of Exhibit "A", or in any manner, or at all, complainant will be deprived of property without due process of law, and deny that complainant will be deprived of property without any process
153 of law, in violation of the provisions of the Constitution of the United States, or in any manner, or at all, and deny that the property of complainant will be taken for public use without just compensation, and in some instances without any compensation, or in any manner, or at all, taken without just, fair and adequate compensation, and deny that by and through the enforcement of said Exhibit "A", or in any manner, or at all, the privileges and immunities of complainant will be abridged and the equal protection of the law denied to it, in violation of the provisions of the Constitution of the United States, or in any manner, or at all, denied to complainant. Defendants deny that the rates and terms fixed by Exhibit "A" were or are wholly void, null, unjust, unreasonable, fraudulent and unconstitutional, or in any manner void, null, unjust, unreasonable, fraudulent and unconstitutional under the provisions of the Constitution of the United States, or in any manner, or at all, and deny that the same are oppressive, confiscatory, ambiguous, uncertain and unintelligible, and do not permit of or provide for a just or fair or reasonable compensation for water service to be supplied from May 1st, 1914, to May 1st, 1915, to the City and County of Denver and its inhabitants, and allege that the rates and terms of Exhibit "A" are in all respects fair, just, reasonable, and provide full, adequate and sufficient compensation to complainant for services
154 rendered and to be rendered, as in said bill of complaint set forth and by said Exhibit "A" required and fixed.

Twenty-first. Defendants deny that Section two of Exhibit "A" was and is unreasonable, unjust and unconstitutional under the provisions of the Constitution of the United States in complainant's

bill of complaint referred to. Deny that said section is confiscatory and greatly inadequate as to compensation to complainant for the services therein contemplated. Deny that the services in said Section two contemplated for hydrant rentals, excluding any service as to fire service and protection, are reasonably, fairly and justly worth the sum of more than $25.00 per hydrant per year, and allege that said services are not reasonably, fairly and justly worth more than the sum of $18.00 per hydrant per year. Defendants deny that the value of complainant's property and water system actually in use for the part of its service referred to in Section two of Exhibit "A" over and above and in excess of the value of the property of complainant required and necessary for all other uses of water supplied by it, has been and will, during the year May 1st, 1914, to May 1st, 1915, be largely or at all in excess of the principal sum which at six per cent per annum would produce the rate or revenue of $25.00 per year per hydrant. Defendants deny that the gross income received by complainant for the year ending
155 May 1st, 1914, did not yield a fair interest or return upon the actual value of the property actually and necessarily used in supplying the City and County of Denver and its inhabitants with water after deducting operating expenses, taxes, depreciation, obsolescence and other deductions to which complainant is entitled, and allege that after all reasonable and proper deductions and allowances the gross income received by complainant for the year ending May 1st, 1914, yielded a fair interest and a reasonable, fair and just return upon the actual value of complainant's property so employed.

Twenty-second. Defendants admit that included in the water system of complainant are certain physical properties which are by their nature and the uses to which they are subject constantly undergoing depreciation, and admit that complainant is entitled to have its property devoted to the public use of supplying the City and County of Denver and its inhabitants with water remain unimpaired in value, so far as its actual use in supplying the City and County of Denver and its inhabitants with water is concerned, and to receive for the services rendered in supplying such water a reasonable return upon the value of the property devoted to such use, and a sufficient amount to protect said property against depreciation and other impairments of value in connection with such use
156 and such water service; but these defendants deny that complainant is entitled to receive compensation of any character for the water supplied to the City and County of Denver and its inhabitants, and allege that said water is the property of said City and County of Denver and its inhabitants, and complainant is entitled to compensation only for its services as carrier in delivering such water. As to the allegation that it is now a common practice for companies of the character of complainant to make an annual allowance for insurance against destruction by fire or other casualty, for depreciation, aging and wearing out, and obsolescence of plant, and to provide a fund for replacing said property when destroyed or worn out, and when it has become obsolete, these defendants have

not and cannot obtain sufficient knowledge or information upon which to base a belief. Defendants admit that there is continually in progress in all water systems a waste and depreciation due to use, ravages of time and action of the elements, but defendants deny that a portion only of such waste and depreciation can be offset by ordinary and current repairs, and allege that in a properly constructed system all such waste and depreciation can be and is offset by ordinary and current repairs. Defendants admit that waste, depreciation and replacement enter into the cost of furnishing, supplying and delivering water. Defendants deny that to maintain a water system and to maintain the properties and water system of
157 complainant it is necessary to provide for, (*a*) ordinary depreciation, and (*b*) obsolescence of portions of the plant, and allege that if ordinary depreciation is properly cared for and protected against, obsolescence such as that described and alleged in paragraph twenty-two of complainant's bill of complaint will not arise. As to the allegation that the practice of making an annual allowance for obsolescence as well as depreciation has become so well established and so necessary that public service commissions in many states in the instructions which they issue provide for a separate statement of such items, and as to whether the term "obsolescence" is now and has been for many years last past generally accepted by accountants as the proper term as indicating the loss resulting from discarded property, plant and machinery before it is worn out, and the substitution therefor of improved property, plant and machinery, these defendants have not and cannot obtain sufficient knowledge or information upon which to base a belief. These defendants deny that obsolescence as distinguished from depreciation constitutes an annual expense to complainant in supplying water to the City and County of Denver and its inhabitants. These defendants deny that complainant is entitled to an allowance to cover extraordinary casualties and contingencies such as fire and flood as an annual or other periodical allowance, to be con-
158 sidered as an element of depreciation, and defendants deny that to cover, provide for and compensate complainant for depreciation, obsolescence and other deductions, as alleged in complainant's complaint, or at all, complainant will be entitled during the year May 1st, 1914, to May 1st, 1915, to an allowance of $170,000.00, and deny that the sum of $170,000.00 is a reasonable amount to provide for such items, and allege that a reasonable and proper allowance to complainant for the items referred to does not exceed the sum of $50,000.00 per year.

Twenty-third. These defendants deny that it is essential, meet, right, proper and necessary to the rights of complainant, present and future, that this court by decree determine the actual and reasonable value of the property and water system of complainant now devoted to and which will be used from May 1st, 1914, to May 1st, 1915, in the supplying of water and the rendering of service in connection therewith to the City and County of Denver and its inhabitants, and deny that if it be determined to be at all proper or necessary that this court should by decree in this cause determine

the reasonable value of the water system of complainant, there should be included or taken into consideration in such determination the alleged going concern or assembled value of said water system, or any allowance whatever for obsolescence or replacement of property destroyed by extraordinary casualty, and deny that this
159 court should in any manner take into consideration in its determination any question of income based upon going concern or assembled valuation, or based upon an allowance for obsolescence or extraordinary casualty; and these defendants, without admitting that any such determination should be made, allege that if it be made the court is only entitled to take into consideration the actual and reasonable value of complainant's water system and the fair value of services rendered by complainant in furnishing to the City and County of Denver and its inhabitants the water belonging to them through the physical system of complainant.

Twenty-fourth. Defendants deny that neither the Council of the City and County of Denver nor any members thereof who passed or acted upon Exhibit "A" had any right, power or authority whatsoever to consider, enact or approve said Exhibit "A" under Article XX of the Constitution of the State of Colorado or the Charter of defendant the City and County of Denver, and deny that each and every act of said Council in reference to said Exhibit "A" is and was at all times of no effect whatsoever, and allege that said Council and the members thereof were fully authorized and empowered under said Article XX of the Constitution of the State of Colorado, and under the Charter of the City and County of Denver to do and perform each and every act done and performed by them in
160 respect to said Exhibit "A." These defendants deny that Exhibit "A" is null and void and of no force or effect whatsoever, because not legally passed or adopted by the Council, or for any other reason, or at all, and allege that said Exhibit "A" is a duly passed, adopted, published and effective ordinance in all respects. These defendants deny that neither the Council of the City and County of Denver nor the members thereof had any right, power or authority to fix or attempt to fix the charges for services rendered and to be rendered by the complainant, and allege that said council was at all times so empowered and acted strictly in accordance with its power and authority in the passage and adoption of said Exhibit "A."

Twenty-fifth. Defendants admit that taxes heretofore paid by complainant have been taxes duly and legally assessed against the property of complainant, consisting of its water system and physical plant, but as to whether the expenditures for operations heretofore made by complainant as in complainant's bill of complaint alleged and set forth are the actual, necessary and reasonable charges incurred in the operation of the properties and water system of complainant for the purpose of supplying the City and County of Denver and its inhabitants with water, these defendants have not and cannot obtain sufficient knowledge or information upon which to base a

belief; but these defendants allege that they are informed and
161 believe, and charge the fact to be, that complainant has made large and extensive expenditures of money in its efforts to force its water system and plant upon the City and County of Denver at a price largely in excess of its actual and reasonable value.

Twenty-sixth. These defendants deny that under Section 4 of Exhibit "A" defendants and each of them are threatening to arrest and fine complainant and any of its officers who may attempt to collect rates other than those set forth in said Exhibit "A", or to do anything contrary to the provisions of Exhibit "A"; but these defendants admit that unless restrained by this Honorable Court they will, in a legal and proper manner, and with orderly procedure, enforce the terms and provisions of said Exhibit "A" as an ordinance of the City and County of Denver. These defendants deny that the enforcement of Section 4 of Exhibit "A" will result in a denial to complainant of the equal protection of the laws, and render its property liable to be taken without due process of law, because complainant is only allowed a hearing on the claim of the unconstitutionality of Exhibit "A" and the provisions thereof, at the risk, if mistaken, of being subjected to enormous, unusual and confiscatory penalties, resulting in the possible confiscation of a large part of its property, or for any reason, or at all. Defendants admit that the inhabitants of the City and County of Denver will make Exhibit "A"
162 and the rates therein provided the excuse and justification by them as water consumers for refusing to pay any charge in excess thereof made by complainant, and allege that the rates fixed by Exhibit "A" are fair, reasonable and just, and all that the inhabitants of the City and County of Denver ought to pay for the services rendered by complainant in supplying them with water. These defendants deny that in manner alleged, or at all, complainant will be unable to effect collection of fair, reasonable and just water rates and charges. Defendants deny that unless defendants and the inhabitants of the City and County of Denver be by the orders and decrees of this court restrained from executing and enforcing Exhibit "A" complainant will suffer great and irreparable injury, or any injury, and deny that a multiplicity of suits will result. Defendants deny that complainant has no adequate remedy at law for the redress of injuries which it claims will be inflicted upon it and its property and officers by the enforcement or the attempt to enforce Exhibit "A", and deny that any injury will be inflicted upon complainant by the enforcement of said Exhibit "A". These defendants deny that the interposition of the power of a court of equity is necessary in any manner, or at all, to protect the alleged rights of complainant and complainant's property, or any rights or property of complainant in any manner, or at all.

163 Wherefore, having fully answered, these defendants pray that complainant take nothing by its bill of complaint herein, but that said complaint be dismissed, and for their costs in this behalf expended.

Third Defense.

These defendants, now and at all times hereafter saving to themselves all and all manner of benefit of exception or otherwise that can or may be had or taken to the many errors, uncertainties and imperfections in complainant's bill contained, for a third defense to said bill, severally answering, say:

First. That repeatedly since April 10th, 1910, whenever complainant has sought a new franchise from or contract with the defendant the City and County of Denver, complainant has suggested that it would and has offered to reduce the rates charged and collected by it for water service to the City and County of Denver and its inhabitants, and particularly after the preparation of the proposed contract between the complainant and the City and County of Denver submitted by the Retail Association of the Denver Chamber of Commerce in February, 1914, and before the said contract was voted upon, on, to-wit, February 17th, 1914, and in advocacy of the adoption of such contract by the people of the City and County of Denver,
164 the complainant herein voluntarily suggested and publicly offered that if such contract was adopted it would reduce its rates and charges for water service rendered the City and County of Denver and its inhabitants, except charges for hydrant service and meter rates, to the extent of ten per cent of such charges, provided only that said City and County of Denver, in adopting such contract, would waive the payment of the sum of $50,000.00 per year in said contract stipulated as a charge to be paid by complainant annually for the privilege of being permitted to continue to occupy the streets and public ways of the City and County of Denver, and to collect fees and charges for water service at the same rates which it had heretofore charged; and these defendants say that by reason of the premises complainant is estopped from alleging, claiming or asserting that rates less than those fixed in Schedule "A" of Ordinance No. 44, of the Series of 1890, or less than those fixed in the Leaflet Schedule as rates to be charged for water services, are in any manner unjust, insufficient, unfair, unreasonable or confiscatory.

Wherefore, having fully answered, these defendants pray that complainant take nothing by its bill of complaint herein, but that said complaint be dismissed, and for their costs in this behalf expended.

Fourth Defense.

These defendants, now and at all times hereafter saving to themselves all and all manner of benefit of exception or otherwise
165 that can or may be had or taken to the many errors, uncertainties and imperfections in complainant's bill contained, for a fourth defense to said bill, severally answering, say:

First. That from the year 1908 to and including the year 1913, the gross earnings of complainant gradually increased, the gross earnings for the year 1913 being twenty-eight per cent in excess of the gross earnings for the year 1908; that during the same period the

operating expenses of complainant gradually increased, the total operating expenses for the year 1913 showing an increase of fifty-one per cent over the operating expenses for the year 1908; that during the same period of time the net income or surplus of complainant also gradually increased, the net income or surplus for the year 1913 showing an increase of fifty-eight per cent over the net income or surplus for the year 1908; that during the same period of time the total gallons of water per year delivered by complainant showed a slight yearly increase, the increase in the year 1913, as compared with the year 1908, being a little less than five per cent, and the average daily delivery for the year 1913, showing an increase of approximately five and one-fourth per cent over the average daily delivery in the year 1908.

Second. These defendants say that in the period 1908 to 1913, both years inclusive, the increase in complainants' operating
166 expenses was out of all proportion to its increase in service and to the increase in its yearly gross earnings, but that nevertheless and notwithstanding such excessive increase of operating expenses complainant's yearly net income or surplus increased fifty-eight per cent, and these defendants aver that if complainant will properly, economically and efficiently operate its plant, and avoid useless and needless expenditures and extravagances, thereby reducing its operating expenses, as it may do, the rates and charges fixed by Ordinance No. 25, of the Series of 1914, of the City and County of Denver, will return to complainant a fair, reasonable, just, adequate and sufficient income upon the actual value of complainant's water system and plant.

Wherefore, having fully answered, these defendants pray that complainant take nothing by its bill of complaint herein, but that said complaint be dismissed, and for their costs in this behalf expended.

I. N. STEVENS,
GEO. Q. RICHMOND,
T. M. PATTERSON,
GEORGE L. NYE,
Solicitors for Defendants.

STATE OF COLORADO,
City and County of Denver, ss:

A. Lincoln Fellows, being first duly sworn, on oath deposes and says: That he is one of the defendants in the above entitled
167 cause, and a member of the Public Utilities Commission of the City and County of Denver; that he has read the above and foregoing answer to the bill of complaint herein, and knows the contents thereof, and that the matters and things therein stated are true of his own knowledge, except such matters as are therein stated on information and belief, and as to those he believes them to be true.

A. LINCOLN FELLOWS.

Subscribed and sworn to before me this 13th day of May, A. D. 1914.

My commission expires November 13th, 1915.

[NOTARIAL SEAL.] I. ANSON WEST,
Notary Public.

(Endorsed:) No. 6274. In the United States district court of the District of Colorado. The Denver Union Water Company, a corporation, complainant, versus The City and County of Denver, et al., defendants. Answer. Filed May 13, 1914. Charles W. Bishop, Clerk. Isaac N. Stevens, George Q. Richmond, T. M. Patterson, George L. Nye, attorneys for defendants, 621-629 Ernest and Cranmer Building, Denver, Colo.

Tenth Day, May Term.

THURSDAY, May 21st, A. D. 1914.

Present: The Honorable Robert E. Lewis, district judge, and other officers as noted on the fifth day of May, A. D. 1914.

168 6274.

In Equity.

THE DENVER UNION WATER COMPANY
vs.
THE CITY AND COUNTY OF DENVER et al.

Bill for Injunction and for Other Relief.

This cause being at issue and it appearing to the court that the issues and the conditions as herein presented are so exceptional as to require the appointment of a special master and the reference of this suit to him for the purpose of taking testimony and reporting to this court; all parties hereto consenting;

It is ordered that W. J. Chinn of Colorado Springs be appointed Special Master in this suit with all of the powers conferred upon the Master under the rules of practice for the courts of equity of the United States, and subject to the further orders of this court, with power, subject to review by the court, to pass upon the legal admissibility of evidence. This suit is referred to said Special Master for the purpose of taking all testimony in the suit and reporting to the court said testimony, his findings of fact and such conclusions of law as he may deem essential to the proper advisement of the court. Each party will deposit within ten days $500 to be applied on Master's allowance.

In the District Court of the United States for the District of Colorado.

In Equity. No. 6274.

THE DENVER UNION WATER COMPANY, a Corporation, Complainant,
v.
THE CITY AND COUNTY OF DENVER, a Corporation, et al., Defendants.

Amendment to Bill of Complaint.

169 Now comes the complainant above named, by its solicitors, and by leave of court first had and obtained, files herein this amendment to its bill of complaint heretofore filed herein, and hereby amends said bill of complaint by adding thereto and interpolating therein as paragraph Twenty-fourth of said bill the following, to-wit:

Twenty-fourth. By reason of the matters hereinbefore more fully set forth, said Ordinance No. 26, Series of 1914, a copy of which is Exhibit A to this bill of complaint, is now, at all times since its enactment has been, and for the entire period of time during which it is to be or is intended to be effective, will be, unconstitutional, void and in conflict with and prohibited by the provisions of the Constitution of the United States elsewhere in this bill more specifically referred to; and it is, and at all times will, provide for, require and constitute a taking of complainant's property without due process of law, and the denial to complainant of the equal protection of the laws. The rates, practices, requirements and provisions set forth in said ordinance, and each and all thereof, were, are and will be unreasonable, confiscatory, unconstitutional, null and void at all times during which by the terms of said ordinance it is provided, intended or contemplated that the same may remain in effect.

And complainant prays that this amendment may be incorporated in and taken and deemed to be a part of its bill as originally filed herein, and that together they may constitute complainant's bill in this cause; and the defendants be required to answer this amend-
ment as provided by the rules of this Honorable Court, but
170 not under oath or affirmation (answer under oath or affirmation being hereby expressly waived); and plaintiff otherwise prays for relief as it has heretofore in its said original bill prayed.

THE DENVER UNION WATER COMPANY.
By W. P. ROBINSON, *Its President.*
GERALD HUGHES,
CLAYTON C. DORSEY,
Solicitors for Complainant.

STATE OF COLORADO,
City and County of Denver, ss:

W. P. Robinson, of lawful age, being first duly sworn, on his oath says: That he is President of the complainant, The Denver Union

Water Company; that said complainant is a corporation, and for that reason he makes this verification in its behalf; that he has read the foregoing amendment to bill of complaint, and knows the contents thereof; and that the same is true of his own knowledge, except as to the matters therein stated on information and belief, and as to those, he believes it to be true.

W. P. ROBINSON.

Subscribed and sworn to before me this 26th day of May, A. D. 1914. My commission will expire March 3, 1915.

[NOTARIAL SEAL.] GEORGE W. SKOULAND,
Notary Public.

171 (Endorsed:) Court No. 6274. Div. In Equity. In the U. S. District Court, for the district of Colorado. The Denver Union Water Company, Plaintiff, vs. The City and County of Denver, et al., Defendant. Amendment to Bill of Complaint. Filed May 27, 1915. Charles W. Bishop, Clerk. Hughes & Dorsey, Attorneys for Complainant. No. —.

In the District Court of the United States for the District of Colorado.

No. 6274. In Equity.

THE DENVER UNION WATER COMPANY, a Corporation, Complainant,
vs.
THE CITY AND COUNTY OF DENVER, et al., Defendants.

Answer of the Defendants to the Amendment to the Bill of Complaint.

Come now the defendants in the above-entitled action, by their solicitors, and answering the amendment made by complainant to its original bill of complaint herein, said amendment consisting of the addition of a new paragraph numbered 24, these defendants say:

They deny that by reason of the matters in said bill of complaint and in said amendment set forth, or by reason of any or all of such matters, said Ordinance No. 25, of the Series of 1914, attached as Exhibit "A" to the original bill of complaint, is now or at any time since its enactment has been, and for the entire period, or any period of time, during which it is to be or is intended to be effective, will be unconstitutional, void and in conflict with and prohibited

172 by the provisions of the Constitution of the United States, or in any manner unconstitutional, void and in conflict with any provision of the Constitution of the United States referred to in said bill, or in said amendment, or otherwise, or at all. Deny that said ordinance is and at all times, or at any time, will provide for, require and constitute, or in any manner constitute, a taking of complainant's property without due process of law, and a denial to complainant of the equal protection of the laws. Defendants

deny that the rates, practices, requirements and provisions set forth in said ordinance, and each and all thereof, or each and any of said practices, requirements and provisions, were, are and will be unreasonable, confiscatory, unconstitutional, null and void at all times during which by the terms of said ordinance it is provided, intended, or contemplated that the same may remain in effect, or at any time or at all unreasonable, confiscatory, unconstitutional, null and void, and these defendants allege that said ordinance is now, ever since its passage has been, and until repealed will continue to be a legal and valid ordinance, binding in all respects upon the complainant herein.

I. N. STEVENS,
T. M. PATTERSON,
GEORGE L. NYE,
Solicitors for Defendants.

(Endorsed:) No. 6274. In Equity. In the United States
173 District Court of District of Colorado. The Denver Union Water Company, a corporation, Complainant versus The City and County of Denver et al., Defendants. Answer of the Defendants to the Amendment to the Bill of Complaint. Filed Jun. 4, 1914, Charles W. Bishop, Clerk. Thomas, Bryant, Nye & Malburn, Attorneys for —— ——, 621-629. Ernest and Cranmer Building, Denver, Colo.

In the District Court of the United States for the District of Colorado.

No. 6274. In Equity.

THE DENVER UNION WATER COMPANY, a Corporation, Complainant,
vs.
THE CITY AND COUNTY OF DENVER, et al., Defendants.

Amendment to the Answer of Defendants.

Come now the defendants in the above-entitled cause, by their solicitors, and tender this their amendment to their answer heretofore filed in said cause, as follows, towit:

In paragraph 15 of said answer, after the words, "in said report," occurring in line 20, on page 19, of said answer insert the following:

These defendants allege and say that at the meeting of the Public Utilities Commission of the City and County of Denver, held on the 4th day of August, 1913, at which meeting the said Commission of Engineers was appointed, the following proceedings, among others, were had and taken:

On motion of Mr. Anderson an advisory committee, consisting of Mr. A. Lincoln Fellows, Mr. C. P. Allen and Mr. E. C. Van Diest,
were appointed to act as an Engineering Committee under the
174 direction of this Commission for the purpose of making careful study of the present value to the City of The Denver

Union Water Company's holdings, and of the proposed projects for furnishing water from the Western Slope for Denver, and the various storage projects on the South Platte River and its tributaries, and of making estimates of the cost of acquiring or constructing a complete water system for the City of Denver by any of the methods proposed, taking into consideration the water supplies available, and to make verbal progress reports from time to time as may be desired, and write a final report at the earliest possible date to this Commission.

And these defendants further allege and say that the powers of said Engineering Commission were as defined in said motion appointing said commission and the members thereof, and not otherwise. The said appointment of a commission is the one referred to in paragraph 15 of complainant's bill of complaint, and the quotations from the report of said commission in the said paragraph of the bill of complaint are a part of the report made by the said Engineering Commission from which the said quotations in the bill of complaint are taken.

Defendants further allege and say that the report of said Engineering Committee, or Commission, referred to and quoted from in paragraph 15 of complainant's bill of complaint, was on the 19th day of January, 1914, received by the Public Utilities Commission and placed on file for future examination; that on the 29th day of January, 1914, at a regular session of the Public Utilities Commission, the following, among other, proceedings were had and taken at such meeting concerning said report, as fully appears upon the minute record of the proceedings of said Commission, to-wit:

'The following was presented by Mr. Van Cise, and on motion was adopted and the Secretary directed to enter in the minutes, upon which Messrs. Van Cise and Anderson voted yea and Mr. Fellows voted no: In directing by our minutes of Monday, January 19th, that the report of the Engineering Committee appointed by this Commission August 3rd, 1913, be received and placed on file for future examination and consideration, the undersigned deem it their duty very briefly to state some of the objections they make to the report and which should be filed with it. The resolution under which the Committee acted did not require or contemplate that it should express an opinion upon the wisdom or desirability of the City's acquiring and constructing a new plant, nor of purchasing the old one. That is a matter which lies wholly with the qualified electors of the City and County of Denver and with this Commission. The estimate by the Committee of the present water plant and system includes much of the plant that is practically worthless to Denver should it become the owner thereof, and in view of
175 the estimates of other engineering committees and experts we deem the value placed upon said plant to be otherwise too high when its age, condition and the manner of its construction are understood. The report does not show such investigation and knowledge as warranted the Committee in fixing the sum it did as the cost of a new plant and system, and the estimate includes items amounting to several million dollars which are not legitimate nor properly to

be associated with a plant constructed solely for supplying Denver with water for irrigation, fire and domestic purposes. For the foregoing and other reasons we cannot approve the report of the Engineering Committee. Signed Edwin Van Cise, Armour C. Anderson.'

Wherefore neither these defendants, nor any of them, are or ought to be in any manner bound by the estimates or conclusions in said report contained.

I. N. STEVENS,
T. M. PATTERSON,
GEORGE L. NYE,
Solicitors for Defendants.

(Endorsed:) No. 6274. Equity. In the United States District Court of District of Colorado. The Denver Union Water Company, a corporation, Complainant, versus The City and County of Denver et al., Defendants. Amendment to the Answer of Defendants. Filed Jun- 4, 1914, Charles W. Bishop, Clerk. I. N. Stevens, T. M. Patterson, George L. Nye, Attorneys for defendants, 621-629 Ernest and Cranmer Building, Denver, Colo.

176 In the District Court of the United States for the District of Colorado.

In Equity. No. 6274.

THE DENVER UNION WATER COMPANY, a Corporation, Complainant,
vs.
THE CITY AND COUNTY OF DENVER et al., Defendants.

Report of Special Master.

177 In the District Court of the United States for the District of Colorado.

In Equity. No. 6274.

THE DENVER UNION WATER COMPANY, a Corporation, Complainant,
vs.
THE CITY AND COUNTY OF DENVER et al., Defendants.

Report of Special Master.

To the Honorable Robert E. Lewis, Judge of the District Court of the United States for the District of Colorado:

1. Pursuant to the Order entered in this suit on May 21st, 1914, and by agreement of the parties, the taking of the testimony herein was commenced on June 3rd, 1914, and thereafter was continued from day to day as is more fully set out in the statement hereto attached, marked "Exhibit A." All of the testimony was taken down

by stenographers appointed by me for that purpose at the request of the parties. All of the testimony, as well as all Exhibits offered on the hearing, are described in "Exhibit A" and are returned and filed with this Report. After the testimony had been produced, the case was fully argued by counsel for the respective parties and
178 printed Briefs have also been filed before me in behalf of each party. Copies of these Briefs are also filed with this Report.

2. In this Report the Complainant, The Denver Union Water Company, is referred to as the "Water Company" and the Defendant, The City and County of Denver, as "the City." Throughout the Report references to the volumes containing the testimony will be found. The capital letter "C" following such reference indicates a volume containing testimony offered by the Water Company and the capital letter "D" in such references indicates a volume of the testimony for the defendants—thus, "Volume 5-C" refers to Volume 5 of the testimony for Complainant.

3. The Water Company has been supplying water to Denver and its inhabitants since October 18th, 1894. The City Council of the City on March 3rd, 1914, passed an Ordinance, known as "Ordinance No. 26, Series of 1914," to regulate and fix the charges by the Water Company for water furnished the City and its inhabitants. This Ordinance by its provisions was to become effective "from and after the date of its passage and approval"—which date was March 3rd, 1914—and was intended to and did reduce the then going (leaflet) rates approximately twenty (20) per cent.

The Bill of Complaint attacks this Ordinance as unconstitutional and void, alleging that the rates fixed by the Ordinance do not permit the Water Company to charge or receive a just or fair return upon the reasonable value of the property necessarily used by it for the delivery of water to the City. The Defendants claim that
179 these rates are fair and reasonable and provide just compensation to the Water Company for the use of its property.

4. In order to decide whether these rates are fair and just, it is necessary to determine from the evidence the following facts:

(*a*) What is the reasonable value of the property used by the Water Company in delivering water to the City and its inhabitants.

(*b*) What return or compensation is the Water Company permitted to earn under the rates fixed by this Ordinance.

5. Many of the facts alleged in the Bill of Complaint are either admitted by the Answer of Defendants or are clearly established by the evidence. These allegations of the Bill are as follows:

(*a*) Paragraphs Fourth (4th) and Sixth (6th) as to the incorporation of the Water Company, the amount of its authorized and issued capital stock, the number and amount of its outstanding bonds, the number and amount of dividends paid to its stockholders and the early history and general description of its water works plant.

(*b*) The allegation of Paragraph Ninth (9th) concerning the incorporation of the South Platte Canal and Reservoir Company, the amount of its issued stocks and bonds, the description of the

property owned by it, the ownership of its capital stock by the Complainant, the lease of its property to Complainant and
180 the relation between said company and the Complainant.

In view of these facts, I find that the property owned by The South Platte Canal and Reservoir Company, insofar as it is used by the Complainant to supply the City with water, must in this suit be considered and appraised as part of the property of the Water Company by it necessarily used to supply the public with water. (Shepard vs. Northern Pac. Ry. Co., 187 Fed. 765, at 809-810.)

(*c*) Paragraph Tenth (10th), concerning the appraisement of all the property owned by the Water Company under the Ordinance of 1907.

(*d*) Paragraph Fifteen (15th) as to the appointment by the Public Utilities Commission of the Public Utility Engineers and the filing of a report by said Engineers, but the allegation that such report was changed before it was filed is not supported by the evidence.

6. The Franchise under which the Water Company operated in the City up to April 10th, 1910, and the schedules of rates in effect up to the time of the enactment of Ordinance No. 26, Series of 1914, are accurately set out in Paragraphs Seventh (7th) and Eighth (8th) of the Complaint.

The Water Company is serving the City and its inhabitants with water, although since April 10th, 1910, it had held no franchise authorizing or requiring it to do so. No water works system capable of supplying water to Denver and its inhabitants, other than that of the Water Company, now exists or has existed since 1894.
181 It appears, however, from Paragraph Twelfth (12th) of the Bill, which is admitted by the Answer, that the City on May 17th, 1910, adopted Section 264-A of the Charter of the City, whereby it created the Public Utilities Commission of the City, directed that an offer of $7,000,000 be made for the property of the Water Company and provided that, in case of the rejection of such offer, steps should be taken to construct and build a water system owned and operated by the City at a cost not to exceed $8,000,000. The Water Company rejected the offer of $7,000,000 for its property. The City has not yet commenced the construction of its own water system.

7. Ordinance No. 26, Series of 1914, was enacted by the City Council as alleged in Paragraph sixteenth (16th) of the Bill. The following additional facts concerning the enactment of this Ordinance are established by uncontradicted evidence:

On July 26th, 1913, the Public Utilities Commission by letter (Exhibit A-46), asked the Water Company on what basis the going (leaflet) schedule of rates had been fixed, and requested a statement of its gross earnings, operating expenses and fixed charges for the preceding three years. The Water Company by letter dated August 16th, 1913 (Exhibit A-47) gave the information requested. This letter also explained the basis of the leaflet schedule of rates and concluded as follows:

"We will be pleased to aid you in investigating these matters and therefore desire to tender to your commission and to the City At-

torney all data in our possession and any information which you may require."

182 The Public Utilities Commission did not seek or obtain any additional information from the Water Company. The Ordinance was drafted at the instance of the Public Utilities Commission and then "regularly initiated by the people under the terms of the Charter" of the City. It was passed by the City Council and approved by the Mayor March 3rd, 1914 (Vol. 5-C, pages 2311-2315). The Water Company had no notice from the Defendants of the proposal to draft or enact the Ordinance, other than that given by its publication in a newspaper on March 2nd, 1914, although as a matter of fact it undoubtedly knew of the entire proceeding. When the Ordinance came before the City Council for consideration the members of that body were of the opinion that it was their legal duty to pass it without making any attempt to determine whether the rates prescribed by it were reasonable. (Vol. 6-C, page 2822.) The Defendants, including the members of the City Council and of the Public Utilities Commission, state in Paragraph Thirteenth (13th) of the Answer that they have not "sufficient knowledge or information upon which to base a belief" as to "the gross earnings, operating expenses, taxes, net income," etc., of the Water Company for any of its fiscal years from 1908 to 1913, inclusive, or as to "the allowances made, or should be made, for depreciation, obsolescence or unusual contingencies."

8. The Water Company insists that the facts above stated authorize and require a modification of the rule of law concerning the presumption as to the validity of this Ordinance which usually prevails in "rate cases." But I do not deem it necessary to

183 consider or decide this question because the evidence clearly requires a finding that the Ordinance is invalid, even when the ordinary rules of law as to its validity are applied to the evidence.

In considering the pleadings and evidence I have been guided by the following rules of law:

(*a*) It is presumed that Ordinance No. 26, Series of 1914, is valid and that the rates fixed by it are reasonable and fair and therefore sufficient to permit the Water Company to earn a fair return for the use of its property by the public.

(*b*) The Water Company has the burden of proving beyond any reasonable doubt that the rates of this Ordinance in fact deny it a fair return on the reasonable value of the property used by it in serving the public.

9. The exhibit filed by the Water Company and identified as "Exhibit C," contains a complete inventory of the property which the Water Company claims constituted the water works plant owned and used by it on November 1st, 1913. This inventory divides the plant into convenient and appropriate classes; and each Class is designated by a letter—thus, Lands and Easements constitute "Class A," Water Rights, "Class B," etc. In this Exhibit each piece of property of a Class is identified by an "Item" number—thus, the Lake

Cheesman lands are "Item 1 of Class A," etc. This classification and method of identification of the property was adopted by the witnesses and parties throughout the hearing of the testimony and is therefore used in this Report.

184 10. The original cost of many of items of property, going to make up the Water Company's plant, cannot be ascertained. The books of its predecessor Companies are not available or do not disclose with accuracy what the original costs were.

The parties agree that neither the par value nor the market value of the outstanding stocks and bonds of the Water Company aid in determining the present value of the Company's property. Therefore, the market value of these stocks and bonds was not proved on the hearing.

11. In this Report the value of the Water Company's plant is found as it existed on May 1, 1914. The evidence shows no material change in the plant between this day and the time when the evidence was heard.

The method of estimating the present fair value of the property, adopted by substantially all the parties on the hearing of this case, and in this Report, is as follows:

Lands and Water Rights are appraised at their present market value.

Estimates of the cost of the reproduction of the structures are made and from such estimated reproduction cost deductions for accrued depreciation are made, so as to determine the estimated reasonable value of the structures in their present condition.

In making such estimates it is assumed that a company attempting to reproduce the structures would not do the work itself, but would cause it to be done under contract, after fair competitive bidding. It is further assumed by the witnesses that the company reproducing the property would incur costs for engineering and

185 superintendence, as well as other costs, in addition to the fair contract cost of the structures.

12. I find from a consideration of all the evidence that the reasonable value of all the property used by the Water Company on May 1st, 1914, as a part of its water plant, for the delivery of water to the City and its inhabitants, is as stated in Table 1, set out in this paragraph.

In this table the figures in Column No. 4 represent the present market value of Class A, Lands; Class B, Water Rights, and Class T, Personal Property. As to Classes C to S inclusive, Column No. 1 represents the estimated fair contract cost of the reproduction, new, of said structures; Column No. 2 represents the estimated cost of the Water Company of the reproduction, new, of said structure, and includes the fair contract cost, plus 12½ per cent. on account of estimated costs for engineering and contingencies; Column No. 3 represents the estimated actual depreciation in value of said structures on May 1st, 1914, and Column No. 4 represents the estimated value of said structures on May 1st, 1914.

TABLE 1.

Class. (Nov. 1st, 1913.)	(1) Fair contract cost, new.	(2) Gross reproduction cost, including 12½% for engineering and contingencies.	(3) Actual accrued depreciation.	(4) Present reasonable value.
A. Lands	.....	.....	.....	$637,814
B. Water Rights	.....	.....	.....	$2,947,617
C. Lake Cheesman Division	$1,000,000	$1,125,000	$26,775	1,089,225
D. Intake—Platte Canon	56,089	63,100	814	62,286
E. Raw Water Conduits	429,925	483,666	5,614	478,052
F. South Platte Canon Division	523,737	589,204	68,040	521,164
G. Raw Water Conduits and Filter	107,790	121,264	47,254	74,010
H. Clear Water Conduits	962,012	1,082,263	182,102	900,161
I. Bear Creek Division	395,361	444,781	48,213	396,568
J. Littleton and Wynetka	34,190	38,464	6,399	32,065
K. Bear Creek Division—Conduits	325,021	365,648	13,360	352,288
L. Cherry Creek Division	108,373	121,920	5,999	115,921
M. Mississippi Avenue Division	135,885	152,871	23,553	129,318
N. West Denver Station	290,628	326,957	125,160	201,797
O. Capitol Hill Division	279,171	314,067	54,125	259,942
P. Ashland Avenue Station	194,138	218,405	98,450	119,955
Q. University Park Station	24,444	27,500	3,451	24,049
R. Montclair Booster Station	3,403	3,828	892	2,936
S. Distribution Pipe System	3,500,000	3,937,500	490,000	3,447,500

T.	Personal Property—Supplies, etc.	190,000	.....	15,314	174,686
	Interest During Construction	805,000	.....	105,455	699,545
	Going Concern Value	.....	.....	.....	800,000
	Value Water Works Plant, Nov. 1st, 1913				$13,475,899
	Deduct Depreciation from Nov. 1st, 1913 to May 1st, 1914, less Additions				60,000
	Reasonable Value of Plant, May 1st, 1914				$13,415,899

187 13. I further find from this evidence that if Ordinance No. 26, Series of 1914, had been in effect during the year ending April 30th, 1915, the gross earning, operating expenses (including taxes and depreciation and the net earning of the Water Company would have been as set out in the following Table No. 2:

TABLE 2.

Gross Earnings under Ordinance No. 26, Series of 1914, and Operating Expenses, Taxes and Annual Depreciation for Year Ending April 30th, 1915.

Gross Earnings year ending April 30th, 1915		$1,093,615
Normal Operating Expenses ending April 30th, 1915	$347,845	
Taxes, ending April 30th, 1915	116,950	
Actual Depreciation, ending April 30th, 1915	140,000	
Total Operating Expenses, Taxes and Depreciation		604,795
Net Earnings or Return		$488,820
Rate of Return on Reasonable Value of Property		.0364+

188 14. The items of property of Class A, (Exhibit C, pages 111 and 119) included in the foregoing Table No. 1, are as follows:

Item. Class A—(Ex. C. pages 111-115).

	Present market value.
1. Lake Cheesman Reservoir and Lands	$160,000
2. Platte River Stone Placer Mining Claim	765
3. Platte Canon Valley	3,065
4. Platte Canon Reservoir Site	9,000
5. Platte Canon Filter Site	1,000
6. Platte Canon Power House Site	1,000
7. Lands Bordering on River	500
8. Lehow Lake	2,500
10. Willard Filter Site	800
14. Dam and Head Gate—Harriman Ditch	1,550
16. Marston Lake Flume	1,137
17. Marston Lake Reservoir	125,000
18. Littleton Mill	4,450
20. Cherry Creek Galleries	4,370
21. Ashland Avenue Reservoir	5,859

22. Ashland Avenue Pumping Station	1,508
24. 10 Lots Cottage Hill Tank Site	1,600
25. West Denver Pumping Station	52,057
26. Tail Race from West Denver Pumping Station	10,731
27. Lake Archer Lands, etc	208,306
28. University Park Tank Site	233
29. South Denver Pumping Station Site	1,083
31. Storage Tank Site Highland Park	533
33. Lands adjoining Cheesman Park	367
34-35-36. Conduits #3, 6, 7	20,000
37. Rights of Way	17,400
Rights of Way through Platte Valley Ranches	3,000
Total Class A	$637,814

189 15. The measure of value of lands adopted in considering the evidence in the present normal market value of similar lands in the same locality. (Minnesota Rate Cases, 230 U. S. 352, at 449-456.) It follows from this rule that the original cost of the lands is not necessarily the controlling factor, though such original cost has been considered along with all the other evidence in determining the value. It likewise follows from this measure of value that when the present normal market value of similar lands in the same locality has been determined, nothing can be added to such value on account of the actual or estimated consequential or severance damages—if any—paid by the Water Company when it originally acquired its lands or on account of the Company's actual or estimated overhead expenses in connection with the purchase of these lands. These expenses represent original costs of the lands and not their present market value. In considering the evidence concerning the value of these lands I have assumed that we may take into consideration their adaptability or availability for any useful purpose, provided the evidence shows that lands possessing such adaptability or availability have any special market value on account thereof: but the final question in my judgment, always is—what is the present market value of similar lands in the same locality and not what are these lands worth now to the Water Company for the purposes for which they are now used.

16. In considering the testimony concerning the market value of lands, greater weight has been given to the testimony of the witnesses Wall, Bowles, Newcomb, Conaway and Watson who testified on behalf of the Water Company, than to the testimony
190 of Messrs. Armour C. Anderson and Carper, who testified for the Defendants, because it clearly appears that the Complainant's witnesses made a more careful examination of the property to be appraised and were better informed as to present market value of similar lands in the vicinity. The above named witnesses were all residents of Colorado and had special knowledge as to land values in the vicinity of the lands involved in this case.

The Company contends that certain of its lands have a higher market value than other lands in their immediate vicinity because

they are peculiarly available as reservoir sites or specially adapted to water works uses.

Messrs. Metcalf and George G. Anderson, two of the Company's witnesses, have attempted to appraise the lands claimed to possess this peculiar value. The values assigned to such lands by Messrs. Metcalf and Anderson are in general the same as the values at which such lands were appraised by the witnesses Freeman, Holman and Hazen, who were members of the Joint Board of Appraisers of 1907.

These witnesses, Messrs. Metcalf, Anderson, Freeman, Holman and Hazen, are men of high standing in their profession and have had a very broad experience in the business of constructing and operating and appraising water works plants. None of them, however, possessed any expert or other special knowledge concerning the present market value of lands in Colorado. In fact, none of them claimed to be an expert on this question. Their estimate of the value of such lands to the Water Company owning and using them as a part of its system is no doubt entitled to very great weight, but their opinion as to the present normal market value of sim-

191 ilar lands in the vicinity is, in my judgment, entitled to little weight because of their lack of knowledge of such present normal values.

17. Metcalf and Anderson have appraised the following lands at sums in excess of the values assigned to them by the expert real estate appraisers who testified for the Water Company:

Item 2. The Platte River Stone Placer Mining Claim.

Item 3. Platte Canon Valley.

Item 5. Platte Canon Filter Site.

Item 6. Platte Canon Power House Site.

Item 20. Cherry Creek Galleries.

Wall and Bowles, witnesses for the Water Company, based their appraisement of these tracts on the present market value of similar lands in the same locality. Metcalf and Anderson believed these lands peculiarly adapted to water works purposes and appraised them at a higher value. I have adopted the Wall and Bowles appraisement of these lands, except as to Items 5 and 6, because the evidence does not lead me to believe that any of the tracts have such peculiar and obvious adaptibility for water works purposes, over and above other lands in the same locality, as to give them any market value above that of the neighboring lands. Items 5 and 6 I find are reasonably worth slightly more than the sums assigned by Wall and Bowles.

18. The Lake Cheesman Reservoir Lands (Item I, Class A) are appraised by Metcalf and Anderson at $200,000, and by Van Diest, witness for Defendants and a member of the Board of the Public Utility Engineers, at $40,799.

192 The record contains very little evidence as to the market value of similar lands. The lands are peculiarly adapted to reservoir uses and are more valuable for such uses than any other lands on the river. For reasons already stated, the testimony of the witnesses Metcalf, George G. Anderson, Freeman, Holman, Hazen

and Van Diest, concerning the market value of these lands cannot be given great weight. These witnesses believed that a company desiring to acquire such a large body of land usually finds it necessary to pay for it several times its normal value and this belief influenced their judgment in their appraisements. The Lake Cheesman lands cost the Water Company not less than $160,000 (Miller, Vol. 2-6, pages 444-445; Vol. 3-6, pages 1399-1400; Vol. 4-6, pages 1492 and 1535-1536). Taking into consideration all the evidence, I believe it reasonable to appraise these lands at $160,000.

19. The Marston Lake Reservoir lands (Item 17, Class A) are appraised by Metcalf and Anderson at $168,000, and by the Engineers of the Public Utilities Commission through the witness Van Diest, at $124,160. Wall and Bowles, considering them merely as dry lands without water, appraised them at $71,780. They were purchased by the Water Company many years ago when the market value of land was much less than it is now. The purchase price was about $87,000. In view of all the testimony, I have appraised them at $125,000.

193 20. The Rights of Way (Items 34, 35 and 36, Class A) owned in fee by the Water Company, cost about $19,166 and are appraised by Wall and Bowles at $23,528. These witnesses, however, included in their estimates some amount on account of the damages they assumed the Water Company had to pay the original owners in the nature of severance or consequential damages. (Vol. 4-6, 1560-1562). I find from the evidence that the reasonable value of the property is $20,000.

21. I find from the evidence that the following tracts of land, inventoried in Class A, do not constitute any useful part of the plant with which the Water Company is serving the public and therefore I have excluded them and all their appurtenant structures from the property to be further considered or appraised in this Report:

Item 9. Phebe Strong Ranch.
Item 10. Wm. Strong Ranch (Except Willard Filter Site).
Item 11. Becky Archer Ranch.
Item 12. Frank Archer Ranch.
Item 13. Mountain Reservoir Site.
Item. 15. Harriman Lake.
Item 19. Sullivan Reservoir Site.
Item 20-A. Woodbury Land.
Item 23. DeLappe Place.
Item 24. Cottage Hill Tank Site, consisting of 43 lots; thirty-three (33) of these lots are excluded and ten (10) included as a part of the operating plant.
Item 30. Office and Superintendent's Residence, Littleton.
Item 32. Lots in Cottage Hill.

194 22. The Water Rights inventoried in Exhibit C (Class B, pages 117 and 118) fall into two groups—appropriations purchased by the Water Company after they were initiated and perfected by others and appropriations originally initiated and perfected by the Water Company or its predecessors.

The purchased Water Rights are:

Items 1, 2, and 3, Platte Canon Ditch.
Items 13, 16 and 17, Harriman Ditch Company.
Item 11, Northern Colorado Irrigation Company.
Item 14, Soda Lakes Reservoir Company.
Item 21, Rough and Ready Mill Ditch.
Item 22, Platte and Denver Ditch.

23. The City Attorney contends (page 173 of printed brief) that the Water Company owns no title or interest in any of these Water Rights but that all of them are owned by the City.

When the Company acquired its purchased Water Rights they were all "adjudicated rights." At the time of such purchase, each grantor of the Company was vested with a right to divert and use a certain quantity of the water. This right was, under the Colorado rule, a property right in the highest sense, and capable of transfer, separate from the lands to which it was appurtenant. (Strickler v. Colorado Springs, 16 Colo. 61, at 68, et seq., Ironston Ditch Co. v. Ashenfelter, et al., 57 Colo. 31, at 39-40.) The property right so purchased by the Water Company has not been transferred by it to the City for its inhabitants. The appropriations have been and now are used to supply the City with water. Such use was not an abandonment of the rights and certainly did not operate as a
195 sale or transfer of them. No decision of any Court has been cited which holds that the act of supplying water to a city by a private company operates to transfer to the city the water rights which constitute the source of supply. These Water Rights were purchased and paid for by the Water Company. They have been used by it to discharge its legal duty of supplying water to the city. They have not been sold or conveyed to the City. They are the property of the Water Company.

24. The facts concerning the Water Rights claimed by the Water Company by original appropriation, are as follows: The Water Company (or its predecessor) at times when franchise contracts with the City obligated it to supply water to the inhabitants of the City, diverted from the natural streams of Colorado unappropriated water which it used as a part of its supply to its consumers in the City. Its franchise contracts with the City have been limited to fixed short periods. The contracts between the Water Company and its private consumers have been simply permits or licenses covering usually six months only. The rates have been paid in advance by the consumer and a failure on his part to pay or a violation of any of the reasonable rules of the Company has operated to terminate his right to use the water. (Exhibits A-34, A-35 and A-36.) The consumer has, under these permits, been merely a licensee who for a sum paid in advance was allowed to use water on named premises, for specified purposes.

The parties hereto agree that such a diversion and beneficial use of the unappropriated water of a natural stream is sufficient to initiate and perfect a right to continue to use beneficially the volume
196 of water so appropriated. The City claims that the ownership of the appropriations so initiated is not in the Water Company, but is in it or its inhabitants—because these inhabitants by actually applying the water to a beneficial use have, as it claims, "per-

fected" and become the "original appropriators" of such water rights.

Where the unappropriated water of a natural stream is diverted and carried to the place of use by one and applied to a beneficial use by another, the "appropriation" is in Colorado "perfected." The ownership of the "appropriation," under such circumstances, is or may be fixed by contract between the one who diverts and the one who beneficially applies such water. It is plain that such parties by contract between themselves may vest the ownership of the appropriation in whom they please. This I understand to be the rule adopted by the Supreme Court of Colorado in City of Denver v. Brown, 56 Colo. 216.

The application of this rule to the facts of this case, places the ownership of these Water Rights in the Water Company. There is no testimony, in the voluminous record accompanying this Report, from which it can be fairly inferred that any consumer of the Water Company at the time he paid his water rates and received his license, believed or claimed he was making an appropriation of the water of a natural stream of Colorado or was acquiring as against the Water Company any right of any nature to the use of water except as stated in that license.

I find that these Water Rights are owned by the Water Company.

197 25. The measure of value of water rights used by me is the present market value of similar water rights in the same locality. No addition to such market value is made because appropriations yielding the large volume needed to supply the City are assembled under one ownership or because the use of this water for domestic and city purposes may be, as stated by some of the witnesses, a "higher" or a "preferred" use as compared with the use of water for irrigation or manufacturing.

26. The testimony concerning the market value of water rights relates almost wholly to rights used for irrigation. Several of the witnesses made estimates of the present market value of the company's water rights for irrigation uses—that is, these witnesses assumed that the water was to be used, not to supply the City, but to irrigate the lands in its vicinity and upon this assumption attempted to measure the value of these water rights by the market value of other water rights now being used to irrigate similar lands. Some—if not all—of these witnesses further assumed that such a change in the place and character of use would necessarily result in considerable loss of water in transit through seepage and evaporation. Such assumed loss was taken into consideration by the witnesses with the result that their estimate of the market value of these water rights for irrigation was reduced to the extent of such loss. These water rights under existing conditions are peculiarly well located for a source of City supply and deliver water with great efficiency and small loss in transit. Therefore the appropriation used for irrigation, which may fairly be compared with these Water Rights, are such irrigation rights as have a like efficiency for the irrigation of the lands to which they are applied.

198 27. Applying the foregoing measure of value, I find the present market value of the Company's Water Rights (Class B, Ex. C, pages 117-118) as follows:

Group 1, being Items 1, 2, 3, 4, 13, 14, 15, 16, 17 and 21.	$949,500.
Item 5, Denver City Water Co. and	
" 6, Mississippi Street (with 21 & 22)	200,000.
" 7, Cherry Creek Galleries	66,000.
" 8, Platte Canon Filter Galleries	65,000.
" 9, " " 34" Conduit	24,750.
" 10, " " 40" "	30,000.
" 11, Northern Colo. Irr. Co.	1,250.
" 12, Lake Cheesman	1,611,117.
Total Class B	$2,947,617.

28. The sum at which Lake Cheesman Water Rights (Item 12, Class B) are appraised in this Report, results from a consideration of the following facts.

The market value of an acre foot of water from the Antero Reservoir has been from $25 to $35. This reservoir is located many miles above Lake Cheesman on the south fork of the South Platte River; its structures are inferior to and less valuable than those at Cheesman and its appropriations are later in date and therefore less valuable. Its water is used to irrigate land near Denver.

Many rights in the Standley Lake have been sold at the rate of $50 per acre foot, payable in bonds selling for 85 to 90 per cent. of their face value. The Standley Lake appropriations are junior to those of Lake Cheesman and its structures are less valuable. Its water is used to irrigate land near Denver.

199 Rights in other reservoirs which supply water to irrigate lands at greater distances from Denver—in Northern Colorado—have been selling at prices equivalent to $50 to $70 per acre foot. This water is chiefly used late in the irrigation season when the demand is great and market value high.

Lake Cheesman delivers water to the City with small loss in transit, is efficient as a source of domestic supply and is available for use and used in periods when the supply of water in the natural streams is limited and the demand for water is great.

These facts, in my judgment, make it reasonable to consider rights in Lake Cheesman more valuable than rights in the Antero or the Standley Reservoirs.

All these facts in my judgment make it clear that the Cheesman appropriations as now used, ought to be valued at a higher sum than the going market price of the Antero or the Standley Lake waters. I have adopted a unit price of $55 per acre foot for these Rights. There is much evidence in this record which tends to establish a higher value. I have refused to adopt the unit price of $60 per acre foot—the appraisement made by many witnesses—because I do not believe the evidence warrants the conclusion that water rights used in the immediate vicinity of Denver have ever sold for

as high a market price as the best rights in Northern Colorado command.

29. There are many estimates in the record of the volume of water available for storage in Lake Cheesman under its decreed appropriations, limited by capacity of the reservoir. I am of
200 the opinion that the testimony and estimates of the witnesses George G. Anderson and George Bull should be given great weight and largely guide in the conclusion finally adopted. Mr. Anderson's estimate of the average available storage of Lake Cheesman, based on fourteen years of records of stream flow and other available data, is about 55,339 acre feet. That of Mr. Bull for a like period is about 51,700 acre feet. Weighing these two estimates in connection with all the other evidence on the same subject, I find 54,000 acre feet to be a reasonable estimate of the water storable in and available for delivery annually by the Cheesman Reservoir.

This volume of water at the unit price of $55 per acre foot, is of the gross value of $2,970,000. The land and structures of this property are appraised as follows:

Lake Cheesman Lands	$160,000.
" " Structures	1,098,225.
Total Lake Cheesman Lands and Structures	$1,258,225.
8% interest thereon	100,658.
Total deduction from gross value	$1,358,883.

The resulting net value of the Lake Cheesman Water Rights is $1,611,117, which I find to be their present value.

30. Group I, of Class B of Water Rights, I find from the evidence to be of the net value of $949,439, estimated as follows:

201 The estimated volume yielded by these Water Rights is 37,000 acre feet of the value of $55 per acre foot, making a gross value of ..... $2,035,000.

Value of Lands and Structures appurtenant	$1,005,149	
Interest 8%	80,411	
Total deduction		1,085,560.
Net Value of Rights		$949,439.

31. The lands appurtenant to the Cherry Creek Galleries (Item 7, Class B) and to the Platte Canon Filter Galleries (Item 8, Class B) are appraised by me at a smaller sum than by Metcalf and Anderson as set out in Exhibit C. Therefore, the deductions from the gross value of these Water Rights are less and the net value found by me greater.

The Water Rights described as Items 7, 8, 9, and 10 are peculiarly available and efficient as a source of City supply. For irrigation

uses they would be less efficient. The testimony related to their present market value for irrigation uses. The evidence convinces me that as a source of City supply they are reasonably worth the sum at which they are here appraised.

32. In the deductions made above from the gross value of Water Rights, one year's interest at the rate of eight (8) per centum on the land and structure value is included. This interest rate was adopted by the Water Company in its estimates and not objected to by the Defendants.

33. I have given great weight to the testimony of Messrs. Hazen, Freeman and Holman concerning the estimated cost of the
202 reproduction of the structures of the plant (Classes C to S inclusive) and accrued depreciation, and the reasonable allowance for future depreciation. These witnesses were members of the Joint Board of Appraisers of 1907. As members of this Board, they considered the property, not as expert witnesses, but as disinterested appraisers acting under oath in a quasi judicial capacity. They are engineers of large experience in designing, constructing, operating and appraising water works plants.

34. The estimates of the fair contract cost of the reproduction of the Lake Cheesman structures (Class C, Exhibit C, pages 119-133), when placed on an approximately correct comparable basis (See Exhibit "A-98," table "A" and Exhibit "A-99," table "C"), are as follows:

Metcalf and Anderson	$1,020,778.
Gaffy	947,600.
Bickel	891,430.

The difference in these estimates is largely accounted for by two Items. One Item—subdivision A of Item 6, amounting to $84,748—is wholly excluded by Bickel and in part by Gaffy. This was an error as the witnesses themselves practically admit. Insofar as this Item was excluded by them, their estimates are too low.

The other Item—subdivision C of Item 6—concerns the estimated cost of the reproduction of the masonry of the dam. The estimate of Metcalf and Anderson for this work is $485,320; that of Gaffy is $421,480 and that of Bickel, $389,050. Mr. Bickel's estimate of the quantity of stone necessary for this structure was too small as the evidence demonstrates. His estimate is further based
203 upon an erroneous assumption as to the character of the stone work of the upper face of the dam.

The contract price paid for this masonry work was $443,474. This contract price did not include the cost of that portion of the first dam incorporated in the existing dam. The evidence shows that the cost of the reproduction of this work today would be greater than was the cost of its original construction.

Giving consideration to all the estimates, as well as to the original cost of the structures, the sum of $1,000,000 is adopted as a reasonable estimate of the present fair contract cost of the reproduction new of the whole of Class C.

35. The estimates of the witnesses as to the cost of the reproduction (new) of Classes D to H, inclusive (Exhibit C, pages 135-215) do not differ greatly. Such differences as exist are due in part to different assumptions concerning the proper method of constructing the slow sand filters and concerning the amount of excavation and back filling for conduit trenches. I am satisfied from a consideration of all the evidence that the estimates of Metcalf and Anderson are the more reasonable and they are adopted by me for all these Classes, with the proper correction in Class F for the errors pointed out by Mr. Metcalf (Vol. 8-C, pages 3695-3696).

36. From the property inventoried under Class I (Ex. C, pages 243-269), Bear Creek Division, I exclude the Harriman Lake structures (Item 6, page 245, Ex. C). The estimate of Metcalf and Anderson of the cost of reproduction new of the remainder
204 of this Class is sustained by the evidence. Its amount is $395,361.

37. From the property inventoried in Exhibit "C" under Class J, (Exhibit C, pages 271-284), there are excluded the following items connected with the offices and superintendent's residence at Littleton:

Item 2-B, Fences, etc.	$475.00
Item 3, Walks	436.00
Item 6-A, sub-items 1, 2 and 3, frame dwelling, barn, etc.	7,594.00

Item 5, the machinery at Littleton Mill, is appraised by Metcalf and Anderson at $30,353. The testimony of the witness O'Ryan (Defendants' Exhibit 69) tends to prove that this machinery can be reproduced for a much smaller sum. I appraise this item at $20,000. After these exclusions and deductions, I appraise this Class at $34,190.

38. I have excluded the structures at Sullivan Reservoir (Item 5, page 302, Exhibit C) from Class L and find the reasonable estimated cost of reproducing the remainder of this Class to be $108,373. The Metcalf and Anderson estimates of Classes K and of M to R, inclusive, are well sustained by the evidence.

39. The witnesses estimate the reproduction cost of the Distribution Pipe System, Class S (Exhibit C, pages 365-390), as follows:

Metcalf and Anderson	$4,333,412
Public Utility Engineers	3,954,076
Gaffy	3,749,365
Bickel	3,671,185
Gordon	3,331,552
Hill	3,403,909

205 Two Items, "Taps for Private Consumers" and "Parallel Track Constructions," aggregating about $250,030, are found only in the Metcalf and Anderson estimate. The sum of $105,000 should be deducted from the Gaffy estimate to bring it to a fair comparable basis with the others—this sum represents the difference growing out of a different assumption as to wage scale.

The estimates of Gordon and of Hill are in my judgment entitled

to less weight than those of the other witnesses, because of the limited experience of these witnesses concerning construction work involved in the estimates, and also because these witnesses made less careful study and investigation of this distribution system.

The item of Pavements (Item 17, Class S, Exhibit C, pages 369-370), amounting to $539,558, is similar to the Pavement item mentioned in the case of Des Moines Gas Co. v. City of Des Moines (decided by the Supreme Court of the United States June 14, 1915) and is excluded on the authority of that decision.

Items 19-C, 20-A, B and C and 21-A (Ex. C, pages 386, 387 and 389) amounting to $109,992, are the estimates of those added costs of reproduction occasioned by the subsequent construction of tracks of railways and conduits of telephone companies over or parallel to or very near the mains of the water system. The presence of these tracks and conduits in the streets adds nothing to the life or utility of these pipes. Such tracks and conduits were not paid for by the Water Company. A change of a few feet in the location of the mains would avoid these obstructions. The exclusion of these Items
205½ is in my judgment the reasonable method of reproduction of the pipe system and is in accordance with the opinion in Des Moines Gas Co. v. City of Des Moines.

Item 25—Taps for Private Consumers (page 390, Ex. C), estimated by Metcalf at $140,038, concerns the estimated cost of the reproduction of the service taps now incorporated in the Water Company's mains and to which the service pipes of the consumers are attached. Under the rules of the Company the taps and the cost of their installation have been paid for by the consumers. Because these taps are incorporated in the mains, the Company claims they are its property. But they are likewise attached to the service pipes belonging to the consumers and paid for by them. To my mind it is inequitable to require the consumers to pay the Company a return on the value of taps paid for in full by them. The Company's claim as to this Item is disallowed.

I find from the evidence that a reasonable estimate of the reproduction cost of the Distribution Pipe System (less the above exclusions) is $3,500,000. This is in excess of the estimates of the Public Utility Engineers and of Bickel and of Gaffy. The last-named estimates are unduly low. The cast iron pipes and the specials constitute a large part of this Class. The unit prices adopted for such pipes and specials therefore, materially affect the amount of the estimates. The market price of these articles fluctuates rapidly. This market price was unusually low when the witnesses last named made their estimates, for which they used the going low price as their unit price. Metcalf and Anderson adopted as their unit price the average market price for ten years. When the Joint Appraisement of 1907 was made, the then going price of these pipes
206 and specials was unusually high; the Board, however, rejected the going prices and adopted the average price of a series of years. I believe that the fairer method of making such an estimate is to make use of unit prices based on the average of a series of years. This is particularly true in a case such as the present

one, where such average price is much nearer the actual prices paid by the Company for its pipes. Hence the Metcalf and Anderson estimate in this regard seems the fairer. The estimates of Bickel, Gaffy and Van Diest (Public Utility Engineers) seem too low in regard to fair cost of the excavation and back filling of the trenches necessary for the excavation of the distribution system.

40. The Personal Property (Ex. C, pages 391-395), constituting Class T, is appraised by Metcalf and Anderson at $247,883, and by the Public Utility Engineers (Van Diest) at about $214,480. Items 19 and 20 (pages 393, Ex. C) consist of personal property on the Platte Valley Ranches used for farming purposes.

The Metcalf and Anderson valuation includes the present market value of the personal property plus certain sums added on account of overhead charges, superintendence and interest on the investment.

This property is such a stock of supplies as the owner must have on hand to properly operate the water works plant. The owner is entitled to a fair return on such property while held in stock ready for use, even though it has not been actually incorporated in the operating plant. Therefore, to add anything in the nature of an interest or carrying charge to the going market value of such property is unfair and clearly erroneous. Nor does it seem reasonable to enhance the present market value of this per-
207 sonal property by any allowance for estimated overhead charges of the Water Company. It is more than probable that all overhead expenses in connection with the purchase, distribution and storage of this personal property are carried into the Company's operating expenses proved and allowed in this Report. I have no doubt that the operating expenses of the Company for the years 1913 and 1914, proved on this hearing, include all overhead costs, superintendence, etc., relating to this personal property. To allow such costs as operating expenses and at the same time to include them in the valuation of the personal property on which the Company is entitled to a fair return, would be erroneous. Deducting Items 19 and 20, above referred to, and rejecting all addition on account of interest, overhead charges, etc., I appraise Class T at $190,000.

41. A reasonable estimate of the reproduction cost of such a plant as the Water Company's must include some allowance for "interest during construction." This involves an estimate of a fair sum for interest on the money necessarily expended in the construction of the plant from the time the work is commenced until the plant begins to earn an income. The Board of Appraisers of 1907 estimated this interest at $850,000 on the assumption that the lands and structures of the plant cost new about $10,604,000. These lands and structures are appraised by me at a somewhat less value and I find an estimate of $805,000 for interest during construction is reasonable and fair. This Item is a part of the cost of the construction of the water works plant and suffers depreciation in the same degree as the other parts of the plant.

208 42. The Water Company (Ex. C. page 64) claims that $120,000, on account of "preliminary Expenses and Organization," should be included in the estimate of the value of the property it is using to serve the public. Mr. Metcalf explained this Item as follows (Vol. 4 (C) page 1700):

"That Item is assumed to cover the expenses of preliminary investigation by engineers and others, the incidental legal work, the formation work, if you like; the work of acquiring the franchise—that is, the legal work—filings, attendance on meetings incident to that, and, in short the general preliminary expenses which might be incurred incidental to an investigation of the project and the organization of the corporation."

The witness further states that in his judgment, the amount was reasonable, conservative.

The allowance elsewhere made for the Company's Engineering and Contingencies is, in my judgment, reasonably sufficient to cover all preliminary investigation by Engineers and others. No franchise exists in this case and the cost of its acquisition cannot be allowed. This Item is disallowed.

43. In the printed argument of the Water Company (pages 627-628) the claim is made that $100,000 should be included in the rating base as the necessary amount of working capital the Company needs to carry on its business. The testimony of Metcalf, relied on in support of this claim (Vol. 4 (C), page 1750) does not authorize its allowance. The Company requires its consumers to pay in advance at the beginning of each six months period and hence usually has in its possession a sum of money greatly in excess of $100,000—paid by consumers before it has actually been
209 earned. This is a sufficient working capital. It would be unreasonable to require the consumer to pay a return on such working capital.

44. The allowance for the Water Company's Overhead charges in the nature of Engineering and Contingencies of 12½% of the estimated fair cost of reproducing the structures (Classes C to S, inclusive) is, in my judgment, fair and well sustained by the evidence.

45. The foregoing estimates of the value of Classes C to T inclusive, refer to the reproduction new of such property. But in fact it is not new. It has been in use for varying periods and has depreciated. Such accrued depreciation must be considered in determining its present value. The extent of such depreciation can be ascertained only by an examination of the property to enable one to see and determine its present condition. Such an examination was made by the witnesses Metcalf, Van Diest, Freeman, Holman and Hazen. The testimony of these witnesses authorizes and sustains as fair and reasonable the allowances for accrued depreciation set out at pages 62, 63 and 64 of Exhibit C. Similar allowances have been adopted by me and are found in Column No. 3 of Table No. 1, in Paragraph 12 hereof.

46. The Water Company claims that after its physical property has been valued in the manner above described, there inheres in the plant an additional element of value designated as "Going Con-

cern Value." The Defendants, admitting that such an element of value exists in a "purchase case," have contended that it
210 cannot be considered in a "rate case." Such was the contention of the parties up to June 14th, 1915, when the Supreme Court of the United States rendered its opinion in Des Moines Gas Company v. City of Des Moines, et al.

This opinion declares that going concern value "is a property right, and should be considered in determining the value of the property, upon which the owner has a right to make a fair return when the same is privately owned although dedicated to public use." Defendants now contend that such "property right" has been sufficiently considered when the physical property of the plant has been appraised at a sum in excess of its "junk" or "wreckage" value.

My understanding of the opinion in the Des Moines Gas case is as follows:

(*a*) "Going Concern Value" is "the value which inheres in a plant where its business is established, as distinguished from one which has yet to establish its business."

(*b*) That "there is an element of value in an assembled and established plant, doing business and earning money, over one not thus advanced, is self-evident. This element of value is a property right, and should be considered in determining the value of the property, upon which the owner has a right to make a fair return when the same is privately owned although dedicated to public use."

(*c*) In considering and estimating this element of value, "each case must be controlled by its own circumstances."

Has this element of value been considered and appraised in the valuation found for the physical property (including Water Rights) of the Company, in the preceding pages of this Report? Such valuation of the physical property represents and is intended to represent the present market value of the Company's Lands (Class A), Water Rights (Class B) and Personal Property (Class T), with
211 no addition whatsoever because such property constitutes part of a long established plant doing a business which yields an income. The valuation of the other Classes of the property is intended to represent its present value determined by its estimated reproduction cost (new), less its actual accrued depreciation, with nothing added because the property is a part of "an assembled and established plant, doing business and earning money." Such valuation of the entire property has been made precisely as if the plant were about to commence serving the public, with its business yet to be established.

The plant is one "where its business is established" and is "an assembled and established plant doing business and earning money." It follows that the "element of value,"—the "property right"—going concern value, remains to be appraised.

The value at which it is appraised by the witnesses is: Freeman, $1,100,000; Holman, not less than $1,154,788; Hazen, not less than $1,100,000; Metcalf, $1,200,000; Van Diest (estimated as development expense) at about $375,628. These estimates are entitled to great consideration and authorize an appraisement of this element

at not less than $1,100,000. Nevertheless, after considering the entire history of the Company and its relations to the City and having due regard to the fact that the City is located in a semi-arid region where the Company has a monopoly of supplying a necessity, I cannot believe it reasonable to appraise Going Concern Value at any sum in excess of $800,000. My opinion is that the Company's witnesses assumed that too long a period and too great an expenditure of effort and money would be necessary to establish such a "going concern" in such a city as Denver. There is no absolute
212 standard by which the fair value of this element can be determined and I adopt $800,000, because no matter how often I have considered the evidence and the arguments, my mind always comes back to this amount as reasonable and fair to all the parties.

47. The property described in "Exhibit C," refers to the plant as of Nov. 1st, 1913. To bring the valuation down to May 1st, 1914, it is necessary to make proper deduction for depreciation between Nov. 1st, 1913 and May 1st, 1914 and to consider the value of any additions to the property during this period. A consideration of such depreciation and additions renders it necessary to deduct $60,000 from the value of the plant as it was on Nov. 1st, 1913 and such deduction is made in the Table No. 1 of Paragraph 12 hereof.

48. The witnesses who testified concerning the reasonable value of the entire plant, appraised it as follows:

Freeman	$15,370,000
Hazen	15,300,000
Metcalf and Anderson	16,000,000
Holman	16,614,719

I have excluded from consideration a portion of the property included in the estimates of these witnesses and have valued many elements of the plant at lower sums. A new plant capable of serving the public with like efficiency cannot, according to the evidence, be built for $13,415,899. Giving due consideration to all the evidence, I find that $13,415,899, is the fair and reasonable
213 value of the property used by the Water Company for the convenience of the public.

49. I find that the Water Company's gross return for the year beginning May 1st, 1914 and ending April 30th, 1915, under the rates prescribed by Ordinance No. 26, Series of 1914, would have been $1,093,615.45. This estimate excludes the item of $12,269.44 for "rentals, Ranch Income," etc., set out in Exhibit A-107. It includes $25,173.72 on account of the delinquent water licenses set out in Exhibit A-107.

Ordinance No. 26, Series of 1914, permits a slight increase in the rates charged certain large consumers using meters. The Company claims the going meter rates have prevailed so long and commercial conditions affecting them are such that they cannot be increased. If the increase can be made the added revenue will be about $16,560,40. I have included this sum of $16,560.40 in my estimate of

the possible earnings of the Water Company under the new rates. About 2.06 per cent. of the gross revenue of the Company is earned for water furnished to consumers outside the City. These consumers pay the old (leaflet) rates and the above finding concerning the Company's gross revenue under the new rates is upon the assumption that these outside consumers will continue to pay the old rates.

50. I find that the reasonable and necessary allowances for normal operating expenses, taxes and depreciation of the plant of the Water Company for the same year (beginning May 1st, 1914 and ending April 30th, 1915) are as follows:

214	Operating Expenses	$347,845
	Taxes	116,950
	Annual Depreciation	140,000
	Total Operating Expenses, Taxes and Depreciation	$604,795

The basis of the foregoing findings as to Operating Expenses and taxes is Exhibit A-107. Deductions of the Ranch Expenses are made in the above estimate and proper deductions from taxes are made on account of taxes on the property heretofore excluded.

The allowance of $140,000 for annual depreciation is based largely on the testimony of Mr. Hazen, who estimated such depreciation at $150,000. His estimate was based on a higher appraisement of the plant than mine.

51. It results from the facts found in Paragraphs 49 and 50 hereof that the net earnings of the Water Company for the year ending April 30th, 1915, under Ordinance No. 26, Series of 1914, would be $488,820. The reasonable value of the property used by the Water Company in serving the public I have found to be $13,415,899. The rate of return allowed under this Ordinance is .0364+ of the reasonable value of the plant.

52. The evidence shows clearly that the Company's plant as a whole, is as stated by Mr. Metcalf (Vol. 4-C, page 1648):

"In excellent condition. The quantity of water is abundantly in excess of the needs of the community, the pressure under which the water is furnished is good, comparing very favorably with the records in the majority of our American cities. In general, I believe that the service furnished by the Denver Union Water Company compares favorably with that furnished by any other water works system in the country."

A number of citizens of Denver testified that the volume of water or the pressure in their several homes was unsatisfactory. In
215 practically every case mentioned by these witnesses the evidence shows that the deficient delivery of water was caused by the service pipe or the plumbing of the property owner and not by defects in the plant of the Company.

The testimony of the witness Goldsmith concerning the volume of water and the efficiency of the system is entitled to great weight and fully justifies the above finding. Mr. Goldsmith was for many years employed by the National Board of Fire Underwriters to make

tests of the water supply systems in American cities for the purpose of determining the ability of such systems to furnish water for fire protection. He has made about forty such investigations in the larger cities of the United States. His investigation in Denver consumbed about three months. It was made before the present suit was commenced. His work involved a thorough test of substantially every portion of the system. It was an independent investigation, made by one fully qualified and for the benefit of persons having no financial interest of any nature in the Water Company. The report made by Mr. Goldsmith and his testimony in this case show that he found the system adequate and reliable and in efficiency equalled only by one other of the plants he had investigated.

53. The Water Company is entitled to a fair return upon the reasonable value of the property used by it for the convenience of the public unless, considering the nature of the service rendered by it, such a return is not fair and just to the public.

216 The rule in this regard is stated in the case of Willcox v. Consolidated Gas. Co., 212 U. S. 19 at 48 as follows:

"There is no particular rate of compensation which must, in all cases and in all parts of the country, be regarded as sufficient for capital invested in business enterprises. Such compensation must depend greatly upon circumstances and locality; among other things, the amount of risk in the business is a most important factor, as well as where the business is conducted, and the rate expected and usually realized there upon investments of a somewhat similar nature with regard to the risk attending them."

The evidence shows that the going rate of interest for loans on business and residence properties in Denver is about six (6) per cent. and on ranch property near Denver about seven (7) per cent. The interest rate provided by the Colorado statute is eight (8) per cent. The current bank rate on good risks is about six and one-half (6½) per cent. According to Exhibit A-59, the average rate of interest paid by the Company for money received for sale of its bonds between 1901 and 1913, was over six per cent., although nominally five per cent.

I find that 3.64 per cent. is not a fair or just return for the use of the property of the Water Company by the public.

The evidence shows the service of the Water Company is of such value as to render fair to the public, rates which are sufficient to yield a fair return on the reasonable value of the property devoted to the use of the public.

I find that the rates prescribed by Ordinance No. 26, Series of 1914, do not permit the Water Company to earn for the use of its property such compensation as is fair to it and to the city and that the enforcement of said Ordinance will result in the

217 taking of the use of said property without just compensation.

W. J. CHINN,
Special Master.

October 5th, 1915.
Denver, Colorado.

218 In the District Court of the United States for the District of Colorado.

In Equity. No. 6274.

THE DENVER UNION WATER COMPANY, a Corporation, Complainant,
vs.
THE CITY AND COUNTY OF DENVER, et al., Defendants.

Exhibit A of Report of Special Master.

1914.

On May 21st, at a meeting with the Solicitors of the respective parties, June 3rd was assigned for the beginning of the hearing of the testimony herein.

The testimony was heard on the following days:

June, 3, 4, 5, 8, 9, 10, 11, 12, 15, 16, 17, 18, 19, 22, 23, 24, 29, 30.

(June 4th was given up to an inspection of the Company's plant in and near Denver by the Counsel, Special Master and many of the witnesses.)

July, 1, 2, 3, 6, 7, 8, 13, 14, 15, 16, 20, 21, 22.

August, 18, 19, 20, 21, 24, 25, 26, 27, 28, 31.

September, 1, 2, 15, 16, 17, 18, 21, 22, 23, 24, 25, 28, 29, 30.

September 10 and 11, at the request of Complainant, I used for a journey to Lake Cheesman with counsel representing each party hereto.

219 October, 1, 2, 5, 6, 7, 8, 9, 12, (met but no evidence heard) 14, 15, 16, 19, 20, 21, 22, 23, 26, 27, 28, 29, 30.

November, 2, 3, 4, 5, 6, 10, 11, 12, 13, 17, 18, 19, 30.

December, 1, 3, 7, 8, 9, 10, 11, 12, ,4, 15, 16, 17, 18, 19.

1915.

January, 5, 6, 7, 8, 9, 11, 12, 13, 14, 15, 16,

March, 1, 2.

The arguments of counsel were heard on March 3, 4, 5, 6, 8, 9, 10, 11, 12, 13.

The parties filed with me the printed arguments hereinafter mentioned. I took the entire record, together with the briefs, to California and studied the record and briefs from about April 10th to July 1st, devoting fifty-six (56) days to this work. After returning from California I have devoted probably at least fifteen (15) days to the preparing of this Report.

The following printed documents were filed with me:

Abstract of the testimony prepared by counsel for Complainant, consisting of 901 pages bound in three volumes,

Argument for Complainant containing 666 pages,

Argument for the City by the City Attorney containing 229 pages,

Argument for the Public Utilities Commission by Mr. Nye—134 pages,

Argument in Rebuttal for Complainant—109 pages.

All these documents are returned with this Report.

The testimony for Complainant is contained in eight (8) volumes, numbered 1 to 8 inclusive and marked "Testimony for Complainant." These volumes contain 3882 pages. Defendants' testimony, consisting of 4356 pages, is contained in seven (7) volumes, marked 1 to 7 inclusive, "Defendants' Testimony."

220 The Exhibits offered on the hearing are identified as set out in the report of the testimony and are returned with this Report.

Letters from Counsel of the parties containing additional arguments and citation of authorities, were received by me and are herewith returned, as follows:

Letter dated July 8, 1915, from Hughes & Dorsey.
" " Aug. 13, 1915, from Nye & Marsh.
" " Sept. 7, 1915, " Hughes & Dorsey.
" " Sept. 17, 1915, " Nye & Marsh.
" " Sept. 24, 1915, " Nye & Marsh.

(Endorsed:) 6274. U. S. District court, district of Colorado. The Denver Union Water Company vs. The City and County of Denver, et al. Report of Special Master. Filed Oct. 6th, 1915, Charles W. Bishop, Clerk.

220½ In the District Court of the United States for the District of Colorado.

In Equity. No. 6274.

THE DENVER UNION WATER COMPANY, Plaintiff,
vs.
THE CITY AND COUNTY OF DENVER et al., Defendants.

Narrative Statement of the Evidence.

James A. Marsh, F. W. Sanborn, Solicitors for Defendants.
Filed Aug. 14, 1916. Charles W. Bishop, Clerk.

221 In the District Court of the United States for the District of Colorado.

In Equity. No. 6274.

THE DENVER UNION WATER COMPANY, Plaintiff,
vs.
THE CITY AND COUNTY OF DENVER et al., Defendants.

Abstract of Testimony Taken Before W. J. Chinn, Special Master in Chancery for the United States Court in and for the District of Colorado, in the Proceeding Entitled "The Denver Union Water Company, a Corporation, vs. The City and County of Denver, a Corporation, et al., in Equity No. 6274."

Abstract of Testimony of Complainant.

Appearance by counsel.

Argument over Sen. Patterson's request for order permitting audit of company's books.

Witness WILBER F. HAWES.

Direct examination.

By Mr. Hughes.

Am assistant engineer and chief draughtsman of D. U. W. Co., since 1894. Have been connected with it or predecessors since 1890, in same capacity. Am familiar with water system as existed
222 in 1890 and prior thereto. Have had charge of plans, estimates, details of construction and operation of distribution system, including supplying construction crews with plans for pipe laying. Since my connection with company all has been work based on plans given out through my office.

Identifies "Exhibit A", large map showing pipe system, hydrants, etc. in City and County of Denver. Scale, 300 ft. to inch. As to streets, subdivisions, boundaries, etc., prepared from official city maps. Explanation of legend of map. Pipe lines now owned and operated by D. U. W. Co. shown in red, yellow, brown and blue lines, solid or dash. Lines owned by City of Denver, by green lines, solid or dash. Map shows also pumping stations, reservoirs, stand pipes and other works owned by D. U. W. Co. in City of Denver. In 1890 Denver Water Co. obtained supply from two sources—Cherry Creek, five miles from city, and Mississippi Street galleries, three miles from city. Cherry Creek supply distributed by gravity from Capitol Hill reservoir; Mississippi Street supply by pumps at West Denver station. Original source of water supply for Denver was located at 15th St. on Platte River, distributed by pumps from station at 15th and Bassett St. Present Capitol Hill reservoir was used in connection with original supply from Cherry Creek. Moun-

tain Water Co. and Beaver Brook Water Co., in 1890, supplied part of North Denver and Town of Barnum from pump station located at W. 7th Ave. and Platte River. Those systems are now part of D. U. W. Co. system. Pump station and sources of supply abandoned, I think, in 1894.

When property of Citizens Water Company became merged into present plant in 1894, it added three additional sources of supply—through conduit No. 1 by infiltration from Platte Canon filter galleries, and through Conduit No. 2 by mechanically filtered water from Platte Canon and Marston Lake—water from Marston Lake being supplied from Bear Creek. Total mileage of pipe in system when all companies merged in 1894, was 423 miles.

Identifies "Exhibit B", showing water supply system located outside City of Denver—reservoir sites, diverting works, filter plants, supply conduits, etc., with time of construction of different pipe lines. Foundation of map prepared from official maps in U. S. Surveyor General's office. (Description of routes of various lines.) Definition of other colorings on map indicating lands and other works owned either by D. U. W. Co. or South Platte Canal & Res. Co. Words "Mountain", "Bear Creek", "City", and "Cherry Creek" divisions on map indicate arbitrary divisions in the plant for convenience in operation, each in charge of a superintendent. Exhibits A and B together show water system from farthest source of supply to a point of delivery. (Statement of various classes of pipe involved in construction of different conduit lines.) Total mileage of distributing pipe and conduits in system October 31, 1913, 532.45 miles.

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Printed sheets tabulating. Mains, valves, hydrants and specials in distribution system, Congressional Grant District. Printed sheets tabulating, Mains, valves, hydrants and specials in distribution system, District East of Broadway. Printed sheets tabulating. Mains, valves, hydrants and specials in distribution system, District West of Broadway. Printed sheets tabulating. Mains, valves, hydrants and specials in distribution system, Arapahoe and Jefferson Counties. Statement of special regulating valves, check valves, Smith fittings, and wrought iron pipe fittings, etc., in whole distribution system.

These valves and specials are all a part of the distribution system. Printed statement, summarizing lengths, sizes and weights of mains and hydrant branches in all districts. Printed statement summarizing length of mains, and hydrant branches in the various districts by districts; date of laying and age of various classes and sizes of pipe in distribution system. Printed statement showing tonnage of pipe laid by years and average weight and age. Printed statement showing tonnage of pipe laid by years and average weight and age for Congressional Grant District. Same for District East of Broadway, same for District West of Broadway, and same for Arapahoe and Jefferson Counties. Printed statement showing number and size of valves in system and number of fire hydrants installed by years, divided in districts as above. Statement of length and size of mains laid under pavements and classification of pavements under which

laid in various districts. Printed statement showing pipe laid under and parallel with or crossing railway tracks.

Printed statement showing length, size and character of pipe removed, abandoned, or replaced in the system. Length and size by years of additions to distribution system from appraisal of 1907 to October 31, 1913. Aggregate 46.589 miles. Additions to conduits aggregate 27.55 miles. Records of the water supplied through the system of the D. U. W. Co. are kept in my department under my jurisdiction. They are telephoned in each day from the places from which measurements are made, tabulated and compiled by a clerk and entered in a permanent record. Water supplied from Platte Canon and Bear Creek is measured by meters at Wynetka. From Cherry Creek by a weir at Capitol Hill Reservoir and from the Mississippi Street Galleries by the record of the pumps at
224 the West Denver Station.

Water pumped at Capitol Hill, University Park, Montclair and Ashland Avenue Pump Stations is recorded but not included in daily supply as that is already in original measurements. Printed statements showing consumption of water in Denver from 1876 to 1913 in total gallons, gallons per capita, also record of rainfall and estimated population in the city and a statement of the amount of water pumped in the various pumping stations in the years 1912-13, in million gallons daily. Statements show measurements of maximum and minimum and average daily consumption but do not show the maximum and minimum rates at different hours per day. The figures given concerning lengths of mains and number of hydrants as shown on Exhibit A do not include mains and hydrants owned by the City of Denver.

Cross-examination by Mr. Nye.

Part of the pipe indicated on Exhibit A as having been removed was entirely abandoned and part of it was taken up and relaid elsewhere. I believe that I can compile a statement showing the amount of the pipe that was taken up and relaid. But cannot show exactly where it was relaid. It having been taken to the pipe yard and redistributed as needed without exact record as to whether it was old or new pipe.

The D. U. W. Co. furnishes water outside of the City of Denver to towns of Edgewater, Sheridan, Englewood and Aurora and to some consumers in Jefferson county not in any incorporated town. The amount of water so furnished is included in total consumption records, except that which is taken before the water reaches the measuring station at Wynetka. I have no way of distinguishing water furnished those consumers and the water furnished in the City of Denver. In the water consumption records, years 1890 to 1894 are not included because the record of water furnished by the Citizens Water Company in that period is incomplete. In making up the statement of pipe mileage I have not considered whether the ppipes were owned by the Denver Union Water Company or by the South Platte Canal and Reservoir Company but have taken them as one system.

I have no data giving loss of water by leakage from conduits or mains. I have maps and records in the office showing the length and size of mains laid by predecessor companies of the D. U. W. Co. These have been verified as to size and location by the D. U. W. Co. in making connections with them. I can either furnish copies of these maps or produce originals for examination. The lines of the Citizens Water Company generally paralleled the lines of the American Water Works Company which included the plants of
225 the old Denver Water Company and the other predecessor companies that had been merged into the American Water Works Company. I can prepare a statement showing the extent of those parallel lines. Some of the parallel lines then installed are still a part of the system of the D. U. W. Co. and in use mainly in the congested district between 13th and 20th Streets and Broadway and Wazee Sts. Pressure Gauges are maintained on the system only at the office and at the different pumping stations. I have made no estimate of the pressure maintained at different points on the system or of leakage in the mains or conduits. I believe such estimate was made by the engineers of the Public Utilities Commission this past winter and think we have a copy of it.

The records in my office do not show the weight of pipe laid by the Citizens Water Company. The D. U. W. Co. has always laid what is known as Class "B" pipe.

Redirect examination by Mr. Dorsey:

Compared with the total quantity of water furnished I believe that the amount of water supplied to consumers outside of the City of Denver would be exceedingly small. Company records that would supply this information are not in my department. None of the wooden pipe in the distribution system of predecessors of the D. U. W. Co. now remains in the distribution system. It has all been replaced by cast iron. There have been no changes in the pipe mileage since Oct. 31, 1913. Four or five additional fire hydrants have been set.

The only loss of water that could occur from the mains or conduits would be in the case of breaks or leaks which would be repaired as soon as possible after they were reported. Any leak that continued for any length of time would be evidenced on the surface of the ground. Loss from such causes could not occur to any great extent. A very large proportion of the water furnished the City is measured at Wynetka. Quantities measured at Cherry Creek and West Denver Pump Station represent 1/5 or ¼ of the total supply. Any error in measuring due to slippage would apply only to the water measured at West Denver Station. There is very little variation or irregularity in the flow of water over the weir on the Cherry Creek Conduit, the concrete well behind the weir operating as a quieting box. In using the term merger in connection with the operations of the companies in 1894 I only meant to imply the purchase of the works of the other companies by the D. U. W. Co. which was organized in that year. The Citizens Water Company began to furnish water either in the latter part of 1890 or be-

ginning of 1891. It continued extending its distributing system until 1894. It did not cover all of the ground covered by
226 the American Water Works Company. Duplication of mains occurring from the construction of the Citizens Water company system does not now exist as in 1894. Most of the duplication now existing is in the congested district where the two systems were interconnected to furnish better service. On checking up my records I find that an allowance of 2 to 3 per cent is made for pump slippage at the West Denver Station. The water system in Denver is mainly a gravity system. Any of the pipe laid by the Citizens Water Company and the Denver Water Company and taken up and relaid would appear in the records of the company from the date at which it was relaid. Changes of their pipes were being made for a period of about six years after 1894. Printed statements showing the draft of water in cubic feet per second from the different sources of supply of the D. U. W. Co. Measurements from which these tables are made are taken by the men in charge of the different divisions and sent into the office in the regular course of business.

Recross-examination by Mr. Patterson:

I began to work for the D. U. W. Co. when it was first organized in 1894. Prior to that I was employed by the American Water Works Company and the American Water Works Construction Company. I think the 423 miles of pipe that I stated composed the system in 1894 was after the consolidation and included the conduits from Platte Canon, aggregating between 40 and 50 miles. I do not remember and would not attempt to state until I have tabulated it, the amount of pipe laid by predecessors of the D. U. W. Co. which was taken up and relaid since 1894. I think the records in my office show two locations where the water mains are bonded to the street railway tracks. I don't remember just when the Citizen's Water Company began to supply water, whether its system was to begin to supply water and seek consumers as rapidly as part of its system were completed. The parallel mains that were taken up were not taken up and discarded but were taken up, as new mains were needed and relaid elsewhere.

Recross-examination by Mr. Nye:

I do not know of any estimates by Mr. Prince of the weights of pipe laid by predecessors of the D. U. W. Co. I don't know of any pipes being laid to carry leakage from wooden mains to storm sewers. Part of the water furnished the system from the Capitol Hill reservoir is furnished by gravity and part is pumped into the high service district by the Capitol Hill Pump Station which furnishes water as far east as Aurora. The distributing pipes in the town of Aurora are owned by the town. We have never
227 made any estimate of the loss of water by evaporation from distributing reservoirs. The Capitol Hill Reservoir, and Ashland Avenue reservoir are both directly connected with the

pipe lines that pass Wynetka. The West Denver Pump Station pumps directly into the mains at West Denver. I think it is used every day but not to the same extent. I have a record in the office showing day by day the operations at each of the pumping stations, and will produce same.

Redirect examination by Mr. Dorsey:

The distributing reservoirs in the City are covered. Covering a reservoir does not affect evaporation from it.

Witness WILBER F. HAWES, recalled.

Direct examination by Mr. Dorsey:

Pages 532-584 Exhibit C, contain detailed statements of street mains of the D. U. W. Co. size, character of material, when laid and length in feet, subdivided between the Congressional Grant District, District East of Broadway, District West of Broadway, and Jefferson and Arapahoe Counties. Offered and admitted as witness' testimony. Since I was last on the stand about 500 feet of 6 inch pipe has been removed from the system at the Civic Center site. No new pipe has been laid. Pages 585-638 of Exhibit C, contain complete statement of specials in mains in the distribution system. Offered and admitted as witness' testimony. Pages 639-677 Exhibit C, contain a complete statement of the valves in distributing mains, their location, number and size. Offered and admitted. Pages 678-705 Exhibit C, contains a complete statement by districts as heretofore described of the fire hydrants in the system together with pipe and specials required for their installation. Offered and admitted. Page 705 of Exhibit C, contains a list of Smith valves and specials in the system and all pressure regulating and check valves. Offered and admitted.

Pages 708-709 of Exhibit C, contains a list of valve vaults in distribution system showing masonry contents, etc. Offered and admitted. Pages 710-758 Exhibit C, contains a statement in detail of pipe laid under pavement and under parking. Offered and admitted. Pages 759-762 contain a statement of corrections of errors to be applied to quantities involved in distribution system, pavements, etc. Offered and admitted. Pages 763-799 Exhibit C contain statement of pipe under steam and street railroad track. Offered and admitted. Pages 800-808 of Exhibit C, contain statement of cast iron pipe taken out of the system. Offered and ad-
228 mitted. Pages 809-810 of Exhibit C, contain statement of cast iron pipe abandoned. Offered and admitted. Pages 810-811 of Exhibit C. Contain statement of wood pipe taken out or abandoned. Offered and admitted. Pages 812-814 Exhibit C, contain statement of cast iron pipe laid to replace cast iron pipe taken out or abandoned. Offered and admitted. Pages 814-815 Exhibit C, contain statement of cast iron pipe laid to replace wood pipe taken out or abandoned. Offered and admitted.

Pages 24 and 25 Exhibit C contain tables showing run off of water in cubic feet per second per square mile on the south fork of

the South Platte above Lake Cheesman. Offered and admitted. Pages 26 and 27 Exhibit C, contain tables showing net stream flow of the South Platte Canon, drainage area 2,688 square miles. Offered and admitted. Page 28 contains table showing the stream flow in cubic feet per second of Bear Creek above Morrison, drainage area 172 square miles. Offered and admitted. Mr. Nye admits that the stream flow records as measured by the D. U. W. Co. are used by the State Engineer and constitute the official record for the flow of the streams at the points designated.

When the D. U. W. Co. was organized in 1894 it took over in the pipe systems of the predecessor companies the following mileage. American Water Works Company system 235.184 miles of mains; 10.435 miles of conduits; total, 245.619 miles. Beaver Brook and Mountain Water System, 40.837 miles. Citizens Water Company, mains, 97.711 miles; conduits, 44.860 miles; total, 142.571. The total mileage of mains—373.732 miles. Conduits—55.295 miles. Grand total 429.027 miles. Since this time, 34.709 miles of the Citizens Water Company mains have been taken up and 0.067 miles abandoned. .1965 miles of conduits laid by the Citizens Water Company have been taken out or abandoned, leaving 105.830 miles of the system of the Citizens Water Company in the present system. At the time of the organization of the D. U. W. Co. there was about 83 miles of parallel main in the distribution system.

Exhibit W. admitted.

Explanations of the additions to the plant of the D. U. W. Co. from the appraisal in 1907 to Oct. 31, 1913, as set forth in Exhibit Z.

Cross-examination by Mr. Nye:

There is no duplication in the items set forth in Exhibit C from pages 532-815. The A. P. Smith fittings and valves are specially designed to permit of connections with the system while under pressure, and once used for that purpose they remain as part of the system. I do not attempt to testify as to the cost or value
229 of additions shown by Exhibit Z, but only as to the facts concerning the additions.

Witness HARRY I. DEBERARD.

Direct examination by Mr. Dorsey:

I am and since 1899 have been chemist and bacteriologist for the D. U. W. Co., obtained technical training at Beloit College, Wisconsin, and Chicago University. Have been employed by the D. U. W. Co. since graduation. The Water company maintains a laboratory for the purpose of keeping track of the character of the water furnished the City. All of the water supplied to the city is filtered either by infiltration, English Slow Sand or Mechanical filtration processes. There are three infiltration plants, one at Platte Canon, one at Mississippi Street on the Platte River, and one on Cherry Creek. One English Slow Sand filter plant at Platte Canon, one Mechanical plant near Platte Canon, and one at Marston Lake.

All water furnished by the company has been filtered ever since my connection with it. (Description of Methods of filtration.) I make tests to determine the condition both before and after filtration. For the purpose of these tests samples of the water are taken at each of the plants in sterilized bottles, which I receive personally at the express office, take to the laboratory and subject to the processes necessary to make the determinations and obtain the information desired. Samples are taken of the river water, of the water in the sedimentation reservoirs, at the filter plants, from the conduits at Wynetka, from Cherry Creek and Mississippi Street conduits and from distribution pipe system in the city. The laboratory is adequately equipped. In addition to the filtration processes there are installed sterilization plants where the water subsequent to filtration is treated with sterilizing chemicals. The water furnished is pure and healthful. I consider the Denver water to be as pure or purer than in any city of like size, or larger, in the country. The D. U. W. Co. takes the utmost precautions to purify the water. It also employs men to patrol and inspect the water sheds above its sources of supply to prevent contamination before its water is taken. The water shed immediately surrounding Lake Cheesman is carefully fenced to prevent any direct contamination of that supply. Pages 52-61 Exhibit C correctly set forth the result of various analyses and investigations of the conditions of the water from the various supplies and filters. This water contains no chemical properties that are deleterious to health. Plates numbered 8 to 17 are
230 diagrams showing the turbidity and bacterial contents of the water prior to and after filtration for the fiscal year 1913. Samples were taken on the dates indicated by the perpendicular lines on the plates and the height of the lines corresponding with the scale shows the result of the examination of those samples. Special examination is made to determine the presence of bacillus coli. It is generally or frequently present in the raw water but practically absent after purification and filtration. By the use of the sterilizing treatment all of the coli group of bacteria are exterminated. The Typhoid germ is the most easily killed by this treatment. Plate number 20 in Exhibit C shows graphically the death rate from typhoid fever in Denver per 100,000 since 1887.

Cross-examination by Mr. Nye:

The first year I was with the company I was assistant to Prof. E. G. Smith, of Beloit College, Consulting Chemist. I do not recall any particular changes in the method of filtration since I came with the company. The Slow Sand filters which were put into operation in 1901 were an additional construction constituting no formal change in the method of filtration. They simply augmented the supply of filtered water. Marston Lake is a sedimentation, storage and distributing reservoir and the water from it is all filtered after it passes the lake. A leak in a main shows an increase in bacteria in the water in the main. There has been more than one occasion when a leak in a conduit has been evidenced by such an increase, but they have not been frequent. If any of the filters should cease

to perform the duty for which they are intended, such failure would be evidenced by an increase in bacteria which I could detect in the laboratory. It would not be manifest if a sterilizing agent were employed. I also make tests to determine the hardness in the water. There is a variation of the degree of hardness from the different sources of supply. The Mississippi Street water is the hardest, Marston lake water is the softest. Water from Soda Lakes has nothing to do with that. There is a very slight increase in the permanent hardness of the water due to the use of the Coagulant in the filtration. There is more chlorine in the water from south fork of the South Platte than in the water from the north fork. The organic matters found in the water are entirely removed by sedimentation and filtration. Tests are made with each sample to determine the presence of organic matter in the water. The sterilizing process itself destroys the bacteria, the filters remove the organic matter and mud and silt that may be in the applied water, acting as a strainer and effect the organic and inorganic matter simultaneously. The water after being filtered does not contain a trace of the chemical used as a coagulant. The water company has made no effort to get rid of the hardness in its water supply because it is not pres-
231 ent in such amount as to warrant any effort in that direction.

I would consider a reasonably hard water better than soft water for domestic purposes. I do not believe that the supply of the D. U. W. Co. would be any better if it was not so hard as it is. I do not know of any complaints having been made as to the hardness of the water supply. It would be possible to reduce the degree of hardness but it would be an expensive process and it could not be used with the present processes of filtration without considerable re-construction.

Chlorines have to do with the incrustations in the water. The water from Marston Lake is a little softer than the other supplies because it is supplied from Bear Creek. The water is not as hard as the water from Platte River though the water from the north fork of the Platte is softer than Bear Creek. The water from the North Fork however is mixed with the water from the South fork. The fencing of Lake Cheesman keeps out immediate contamination of that water supply from animals, human beings, etc. The water before reaching and after passing through Lake Cheesman flows in the natural channel of the stream which is not fenced but which is protected by inspection and patrol. Even with these sources of pollution I think there is an advantage in the fencing of Lake Cheesman. Sulphate of copper is used to obliterate algae growths that might be obnoxious as producers of odors. Alum is used as a coagulant in the mechanical filtration process. Hypochlorite of lime is used as a sterilizing agent but it has not been found necessary to use it at all times. The typhoid group of bacilli are different from the coli group. The typhoid must come from the excheta of human beings. The removal of the colon bacilli however is necessarily accompanied by the removal of the typhoid bacilli. Tests for typhoid is not positive so we use the test for coli as an index of removal of the typhoid. Colon bacteria occurs in about 60% of

the raw water samples. Occurs about as frequently in the Bear Creek supply as in the Platte reservoir supply.

Redirect examination by Mr. Dorsey:

The water from Cherry Creek and the Mississippi Street galleries are analyzed less frequently than the other supplies because they are more uniform. This practice results from our experience in handling these waters. I think our tests are of a character to keep us constantly informed as to whether the filters are properly operated and performing their office. Moderately hard waters are considered better than very soft waters. Water of the degree of hardness as this water may require a slight increase in the consumption of soap.

232 This water is used in large quantities for steam boiler purposes by railroads and stationary plants. The operation of these boilers has been carried on successfully. The methods used in the treatment of this water supply are the improved and modern methods. The mechanical filters have been installed for a number of years but they are as efficient as any in the country. There is considerably greater necessity for fencing a body of deep standing water to prevent bodies of animals, etc., from falling into it than is the case of shallow flowing streams above and below Lake Cheesman. Typhoid bacillus is never present except when the colon bacillus is present. When you remove the colon bacillus from the water you are able to say with safety that the typhoid bacillus is also removed.

Recross-examination by Mr. Nye:

Approximately 99 per cent of the harmful bacteria are removed from the water by the process of treatment. We have removed as high as 99.9 per cent of all bacteria. I would not say that the Colorado Springs water supply is any purer bacteriologically than Denver supply or as pure. I would not say that it was as good a supply as Denver. I do not think that they filter the supply and it might be subject to serious pollution at times. The mechanical filter plants of the company are about 21 years old. They are not inadequate. They are as efficient now as they ever have been and I know of no other more efficient filters on the market. It is not necessarily true that clogging of a mechanical filter increases the bacteria by affording a culture medium.

Redirect examination by Mr. Dorsey:

I consider the efficiency of the filters of the D. U. W. Co. equal to the filters in any city.

Recross-examination by Mr. Nye:

The combination of the right amount of sterilizing agent and an efficient plant brings about the highest removal of bacteria coupled with the best quality of effluent. And that is what we have in this case.

Witness DAVID G. THOMAS.

Direct examination by Mr. Dorsey:

I am Chief engineer and General Superintendent of the D. U. W. Co. Been connected with the company or its predecessors about 25 years, the last 6 or 7 years as Chief Engineer, of the
233 company. Description of water system. Method of treating, distributing and measuring the water supply to the city. The plant of the D. U. W. Co. consists of storage reservoirs, filter plants, and distributing system. Lake Cheesman, capacity 26 billion gallons, 48 miles from the city. Marston Lake 6,400,000,000 gallons, 4 miles from city. The principal intake works are located in Platte Canon 23 miles from the city where a concrete dam and intake chamber diverts water into a 60 inch conduit which carries the supply to Marston Lake, 13 miles distant, to the Platte Canon Reservoir 3 miles distant. At Platte Canon is located a slow sand filter plant and sedimentation basins where the water settled in the Platte Canon Reservoir is purified. At Willard, two miles below Platte Canon, is a mechanical filter plant which furnishes an additional method of purifying the settled water from Platte Canon Reservoir. Water from the Slow Sand filter plant is conveyed to the city through a 40 inch conduit terminating at the Ashland Avenue Reservoir on the north side. Water from the Willard Filter Plant is conveyed to the city through a 34 inch conduit terminating at Capitol Hill Reservoir. At Platte Canon is also located an infiltration plant taking the ground water supply at a depth of about 15 feet which is conveyed to the city through a 30 inch conduit terminating at the Ashland Avenue Reservoir. Marston Lake in addition to receiving a supply of water from Platte Canon receives a supply from Bear Creek through the Harriman Ditch and flume, diverting at a point above Morrison. Water from Marston Lake is treated in a mechanical filter plant and conveyed to the city through a 48 inch conduit terminating at the Capitol Hill Reservoir. All of the water from Platte Canon and Marston Lake is measured by Venturi meters at Wynetka about 1 mile west of Littleton. At this point all of the conduits are interconnected so that water may be transferred from one to another in event of breaks above or below that point. On Cherry Creek near Sullivan, 6 miles from the city is located another infiltration system. The water from which is conveyed to the city through a 36 inch and 30 inch conduit terminating at the Capitol Hill Reservoir. At Mississippi Avenue on the Platte River is located another infiltration system. Water from which is conveyed to the West Denver Pumping Station through a 40 inch and 48 inch conduit. The water from Platte Canon, Marston Lake and Cherry Creek is distributed to the greater part of the city by gravity pressure from the Ashland and Capitol Hill Reservoirs. The water from Mississippi Street is forced into the distributing system by the pumps at the West Denver Pumping Station which operate against the head created by the Capitol Hill
234 reservoirs. In addition to the gravity system there are 3 high pumping services, embracing territory lying at an eleva-

tion too great to be properly served by gravity pressure. The pumping station at West 29th Av. and Sheridan Boulevard supplies the high territory in the northwest portion of the city. The pumping station at the Capitol Hill Reservoir supplies the Higher portion of Capitol Hill and Park Hill, Montclair and Aurora. The pressure in Montclair and Aurora being supplemented by a booster station located at 26th Avenue and Monaco St. A pumping station at South University and Jewell Ave. supplies the high lying territory in the South eastern portion of the city. Water from these reservoirs and pumping stations is delivered to the consumers through large cast iron mains occupying various streets in the city. The water is served to consumers at a good domestic pressure. For our information that we may know that good pressure is being supplied we maintain pressure gauges at each of the pumping stations and keep and record the elevation of water in the different reservoirs and know from the pressure on the pumps and the height of water in the reservoirs generally what the pressure is in different parts of the city. The devices provided for measuring water are accurate and approved devices. The weir at the Capitol Hill reservoir over which water from the Cherry Creek is measured is calibrated and a flow table takes into consideration all variations in velocities that might occur at different heights over the weir. We have made no allowance for leakage after water passes the measuring devices because if any leaks were present it would be apparent on the surface of the ground immediately and it would be reported and repaired. There is no appreciable evaporation from covered reservoirs.

Some water is supplied to consumers outside of the city of Denver. I should say that 3 per cent would be the outside limit of consumption outside the City of Denver. Table of comparative elevations herewith submitted shows the elevation of various working points of the water system above city datum. Plate No. 5 shows the catchment basin of the South Platte River above Denver. Sheets numbered 22 and 23 show the elevations of water in Marston Lake from 1903-1913 with computations as to evaporation from the surface thereof. Sheet numbered 40 shows the amount of water pumped in the different stations of the D. U. W. Co. for 1912-1913. Sheet Numbered 51 shows the amount of water supplied by the D. U. W. Co. from the different sources. Plates 21-35 show details relating to the construction of wood pipe conduits as done by the D. U. W. Co. Plates indicate character of trenching and different size pipe, number and size of staves, size and construction of bands and shoes, and tables for band spacing according to pressure.

235 Cross-examination by Mr. Nye:

Sedimentation basins above the slow sand filters at Platte Canon are used in the event of interruption of supply to the Platte Canon reservoir and also furnish additional process of sedimentation to supplement the work of the Platte Canon reservoir, when the reservoir water is unusually turbid.

These sedimentation basins add much to the sedimentation efficiency at Platte Canon. There are three filtered water conduits and

one infiltration conduit passing Wynetka. They are interconnected. The 30 inch conduit and 40 inch conduit from Platte Canon, the 34 inch conduit from Willard filters and the 48 inch conduit from the Marston Lake filter plant.

We have made some experiments, but on a small scale, to determine the evaporation from the covered distributing reservoirs and found that it was negligible.

I estimate that the quantity of water furnished outside the city limits of Denver is not more than 3 per cent of the whole supply. From my knowledge of the amount of water pumped to Aurora and Montclair by the booster station at 26th Avenue and Monaco Street, by comparing populations of Aurora and Montclair with the other territories in which we supply water I venture to say that 3 per cent is high.

Cross-examination by Mr. Patterson:

In the figures relating to the quantity of water pumped at the various stations the pressure against which this water is pumped has no bearing upon the quantity. Quantity is determined by the displacement of the pump and the number of revolutions. Pressure simply indicates the pressure at which water was discharged. The maximum pressure at the Union Depot has been about 85 pounds for a great many years.

(Argument by Counsel, as to pressure decision reported in 41st Colorado.) A large pipe under small pressure will furnish more water than a small pipe under large pressure. Pressure is one of the important elements in a water supply but it is not the only element. There are places in the City of Denver where water discharged through 500 or 600 feet of fire hose will not reach the top of a two-story building. The Mississippi Street Galleries are built in the sands immediately adjacent to the river, about 20 feet below the surface of the ground and are always filled with water. There are manholes extending to the surface of the ground through which the galleries may be entered. The galleries were built in 1880 or 1881. It is the flow through the sands horizontally that supplies the water for the galleries. The Cherry Creek Galleries are similarly constructed except they are built of concrete pipe instead of wooden crib. We know that when water stands at an elevation of 216
236 or over at the Capitol Hill Reservoir that we are furnishing a good serviceable pressure. If the water will not flow in a bath room on the second story of the house when the water is being used to sprinkle the lawn it is because the pipe leading to the house is too small. The architect, plumber or man who owns the house is responsible and not the water company.

I know of no surveys having been made with a view to furnishing a complete gravity supply for the city from Sullivan reservoir. Surveys were made for a pipe line to bring water from Cheesman reservoir to Sullivan reservoir from which part of the city could be supplied by gravity. It would not be as economical to supply water to Dnver with a complete gravity system as with the present combined pump and gravity system. The interest charges on a

conduit from Lake Cheesman to Sullivan would exceed the cost of operating the pumping stations. I estimated the cost of that conduit at about three million dollars. The Cheesman-Sullivan survey was made 5 or 6 years ago. If that line was constructed it would not do away with Marston Lake.

Cross-examination by Mr. Nye:

Static pressure is the dead pressure on a pipe due to the height of water standing above the point at which pressure measurement is made. The static pressure is reduced in the pipe when water is drawn from it. There is no formula that I know of by which the exact reduction over the entire system could be determined by the relationship of the number of taps or consumers to the water supply. It is not true that during the irrigation hours water pressure in the downtown district is insufficient for fire protection. In certan sections of South Denver where the distributing pipes are owned by the city that is true. It is not true in the Capitol Hill district. It is not true in Globeville. The 4 inch pipes in Globeville are only laterals to the main supply. In South Denver there are long lines of 4 inch pipes unsupported. Every summer we test pressures on different parts of the system to determine whether there is a necessity for increasing the supply of water in those sections to take care of additional consumption that may be incurred. The pressure maintained at the Water Company's office is about 65 pounds and at the West Denver Pump station about 85 pounds. It varies between these points and over the city according to variation in elevation. What we refer to as the low service is the gravity service from the Capitol Hill and Ashland Ave. reservoirs and low refers to the elevation and not to pressure. What we refer to as the high service is the pumping districts in different sections of the city. Along Colfax Avenue the dividing line between the high and low
237 service is at about Corona Street. The highest pressure on the system is about 100 pounds that occurring in Park Hill and out toward the Stockyards.

Redirect examination by Mr. Dorsey:

There have been practically no changes in the system since October 31, 1913. An additional boiler feed pump has been installed at Capitol Hill station and half a dozen fire hydrants have been placed. The stock of materials on hand is practically the same. For 15 consecutive days during the summer of 1913 the average daily consumption of water was 70 million gallons and upwards. During certain hours of the day water was furnished at a much greater rate than that. The plant must therefore be equipped to carry that peak load.

Exhibit A. shows accurately the distribution system of Denver as it exists today. We are not dependent for the information there shown upon the records of the predecessor companies. We have made connections to all of the mains in the system since the formation of the D. U. W. Co. and know from observation that the mains are as they are indicated. The capacity of the Platte Canon Reser-

voir is 300 million gallons. Marston Lake 6,400,000,000. The sedimentation basins at the Platte Canon Filters are necessary to augment the efficiency of the sedimentation when the river water is highly turbid. This is because the water has not as long a time to settle in the smaller reservoir at Platte Canon as it has in the large reservoir at Marston Lake. Sedimentation depends entirely upon the time that the water remains in a reservoir. The city of Denver has always been equipped with fire engines for extinguishing fires. The water system has always been operated with the understanding that fire engines would be used in connection with fires, and the city has equipped itself with fire engines and other fire apparatus with that in view. There are places in Park Hill where fire hydrants are twelve to fifteen hundred feet apart because the city has not authorized the water company to locate hydrants. The company cannot of its own accord install fire hydrants and receive compensation therefor from the city, it must be done by authority and direction of the City. The timber construction in the Mississippi street galleries is the same as originally installed. Timber galleries constructed at Cherry Creek have since their original installation been replaced by the concrete pipe. The timber galleries at Mississippi Street are of rectangular construction and the original installation on Cherry Creek were semi-circular in construction, sand got into the semi-circular water space and blocked it off preventing the flow of water. Nothing of that sort has occurred at the Mississippi Street galleries. The timber construction at Mississippi St. is con-
238 stantly submerged in water which preserves the wood and is in as good a condition today as it was when installed. The service pipes in residences that are at fault, when sufficient water cannot be obtained, are owned, installed and controlled by the owner of the property. And the fault is the fault of the owner of the property and not of the Water Company. The pipes in the distribution system in South Denver that are too small were originally installed by the town of South Denver and now belong to the city of Denver. The new water system being installed in Los Angeles in which a single aqueduct is used to conduct water for a long distance employs large storage reservoirs near the city of Los Angeles, into which the water is delivered by the aqueduct and upon which they would depend for supply in the event of breaks in the aqueduct. The city of Los Angeles also has its present infiltration system which it proposes to keep in service to supply water in event of trouble with the aqueduct. If the theoretical scheme suggested by Senator Patterson for the construction of a single aqueduct from Lake Cheesman to Denver as the sole supply were adopted it would be necessary to install large storage reservoirs in the city or go out of business if anything happened to the aqueduct.

The reservoir now constructed at Sullivan would furnish only about one-half a day's supply, which is insufficient as a safeguard against this condition. With the system as at present operated in Denver there is the safeguard of a large number of conduits and also the Marston Lake reservoir within 3½ miles of the city containing nearly six and one-half billion gallons of water. If the single

aqueduct were constructed it would still be necessary to retain Marston Lake. When we find that there are too many consumers on a main for its capacity we increase the supply by bringing an additional feeder for that main.

Recross-examination by Mr. Nye.

We do not keep the pressure gauge records on file except for the current month in which we are operating because they accumulate to such an extent that we have no room for them. The records are really for a day to day information to indicate to us whether the system is operating normally or whether breaks or unusual drafts occur. We began destroying these records, every month, about a year ago. Previous to that time we let them accumulate for five or six years. I will be glad to preserve those records and future records until the final determination of this case.

My knowledge of the size and location of the distribution mains obtained from inspection in making connections with them
239 checks with the information on the map Exhibit A. The records of the date of laying of the mains by the Denver Water Company and the American Water Works Company are exact, but the records of the dates of laying by some of the other companies were not as well kept. We have the records to show when pipe laid by some of the old companies was taken up, but cannot tell exactly to what point it was transferred in relaying. It was taken to the pipe yard, and after it reached there was regarded as so much pipe on hand without regard to where it came from. The pipe was in good condition when taken up, was cleaned and when relaid was as good as new again. Some was repainted but some did not need it. Some small pipe was abandoned, cut off from the system and left in the streets. The mileage of pipe owned by the Denver Water Company in 1894 was greater than owned by the Citizens Water Company probably one hundred miles greater.

So far as I know the Company has always complied with the directions of the city to install fire hydrants. The understanding as to the use of fire engines by the city for the extinguishment of fires was not contained in any ordinance or contract. It was simply an implied understanding because the fire department was always buying steam fire engines for use in the city. It is good management and good economy to operate fire engines with an abundant water supply to furnish the engines with water. Every large city in the country uses fire engines to put out fires.

When the sedimentation basins above the filters at Platte Canon are being used for a second sedimentation they do only a small portion of the work of sedimentation. There are times when the water in the river is so turbid that we do not attempt to use it at all but shut out the intake and draw the supply from the reservoir until the existing turbidity ceases. It is true that when the turbidity of the water is high the capacity of the sand filters is determined by the capacity of the sedimentation basins to supply them with the character of the water desired. The sedimentation basins above the

filters are not in service now, they were this winter about 2 weeks in January when the ice gorge produced an excessive turbidity. We operated the sedimentation basins last summer, I don't recall for how long. The nominal capacity of the slow sand filters is about thirty million gallons daily. The slow sand filters have been enlarged since the construction of the Platte Canon Reservoir. The water from the sedimentation basins passes to the filters over a weir which acts as a skimmer, taking only the surface water.

The service pipes are own-d and installed by the consumers. The actual service connection with the main is made by the company and the connection furnished by the company at the ex-
240 pense of the consumer. It is not true that on Capitol Hill about the dividing line between the high and low service absence of pressure is noticeable over a considerable area.

If an accident occurred to the 60 inch conduit in Platte Canon the Platte Canon Slow sand filters would be supplied by direct diversion from the river, and the Willard filters from the stored water from the Platte Canon reservoir until repairs could be made, or the pumping plant at Platte Canon would be used to pump the water from the slow sand filters on through the mechanical filters to the city until such time as the repairs could be made. We could do that indefinitely.

I know that it is a fact that the water furnished on the North side of the city at present is very dirty water. There is a break on the conduit from the infiltration plant at Platte Canon. I think we first noticed the break last Friday. The conduit at that point is laid a couple of hundred feet away from the bank of the river but floods in the river has caused it to come out of its banks and up on the land in which the pipe lays.

Redirect examination by Mr. Dorsey:

The point at which the river water is getting into the conduit is about three-quarters of a mile north of the filter plant, at Beans' Farm. The flood in the Platte river at present is very unusual, the water never before had been up to the point where it is now. The flood has done a great deal of other damage along the river. It has covered the roads, washed out bridges and is unprecedented in the last 40 years since records have been kept of the flow in the river. In addition to the intakes at the sedimentation basins and the stored water in the Platte Canon reservoir the High Line Canal could be used to convey water to the Platte Canon Reservoir in the event of a break of the 60 inch conduit. The stored water from Marston Lake could also be made to supplement the supply from Platte Canon.

In destroying the pressure gauge charts we had no design whatever except to dispose of something that was taking up room. The record of the height of water in the reservoirs and the pressure on the pumps at the pumping stations are preserved in the permanent records. These permanent records indicate at all times the pressure on the system. The reservoir capacity of the sedimentation basins

at Platte Canon in no way limits the sedimentation capacity because the water is constantly moving through the basins to the filters.

Recross-examination by Mr. Nye:

The flow in the river today at Platte Canon is about twenty-four to twenty-five hundred feet, which is about seven to eight
241 hundred less than a week ago. The river water is standing now about three feet deep on the ground over the top of the conduit. It would be possible to utilize Marston Lake to supply the normal capacity of any one of the conduits passing Wynetka in addition to the conduit that it normally supplies. The Marston Lake filters are at present operating at about 70 per cent of their capacity. The service pipes are owned and controlled by the property owners. We recommend to the consumer not to put in too large a connection to the main but leave it to his discretion to install as large a service pipe as he desires as a corporation cock will give enough water to furnish a pipe 25 to 50 per cent larger than the hole in the main. We would install an inch connection for a consumer if he were willing to pay for it.

Witness NORMAN REED.

Direct examination by Mr. Dorsey:

Am an electrical engineer, now assistant general manager Colorado Power Co. Formerly chief electrical engineer and superintendent motive power Denver City Tramway Company. Was with the Tramway Company from Sept. 1909 to June 1913. To eliminate electrolysis of the water mains of the D. U. W. Co. these mains are bonded to the tracks of the Denver City Tramway Company at different points where the flow of stray currents indicates danger of electrolysis.

The water pipes are not used as part of the system of the Tramway Company but stray current finds its way on to the pipes and must be taken off to prevent injury. Similar return currents are flowing along the line of the street railway system in the street all the time. There's no danger of shock or disturbance to those using the water service from the pipes. This installation was made before I went with the Tramway Company. The use of this drainage system is very general throughout the country. The telephone company has similar connections between the tracks and its cables. The water system of Globeville, which is owned by the City of Denver, is bonded to the tracks of the tramway company. The work was authorized by the Public Utilities Commission. I conducted the survey for this work myself but the actual work was done after I left the Tramway Company.

Cross-examination by Mr. Nye:

I did not conduct any electrolytic surveys for the Tramway Company except the one in Globeville. Connections were decided on

there at three points. I think it was the right and proper
242 thing to do. Without an artificial bond decomposition takes place where the current leaves the pipe. If it continues long enough and is serious enough it is liable to result in a break in the pipe. Insulated joints at intervals on the pipes probably would be more dangerous than non-insulated joints. The likelihood of pipes picking up stray current depends upon the resistance of the earth and the pipes would be no more liable to pick up stray current where they cross under the track than where they parallel them. It is impossible to entirely eliminate stray currents so the safest and best plan is to control them. The only danger that might occur to the Tramway system from stray currents is the loss of power. I never saw a leak on the pipes caused by the stray currents but was told by the Utilities Commission that a leak had been caused in Globeville. The stray currents are liable to start at a considerable distance from the generating plant.

Redirect examination by Mr. Dorsey:

After going over the matter of the electrolysis in Globeville with the Utilities Commission they authorized the expenditure of a certain sum of money in connection with this bonding. It is the point where the current leaves the pipes, not where it comes on to the pipe that the electrolysis takes place. It is possible that natural soil conditions or conditions other than proximity to a power house may cause the current to leave the pipe. But these locations are found by such surveys as have been made and it is then possible to provide for them by bonding.

Witness FRANK ROBERTON.

Direct examination by Mr. Dorsey:

Am chief clerk to the auditor of the D. U. W. Co. In Oct. 1913 I had personal charge of making the inventory of personal property. Printed pages Numbered 819-872 contain the inventory of the personal property of that class as existing October 31, 1913. I personally went to each of the stations enumerated and with the foreman or employes there went around listing all of the articles found and checked them with the previous years inventory. Pages 819-872 admitted as witness' detailed testimony. Changes are occurring in the amount of material on hand all the time but except as to item numbered 23, being the material at the West Denver store house and yard, no substantial change has taken place since that inventory. A report is made each month by the store keeper of the changes in material on hand at the West Denver yard. (Detailed state-
243 ment by witness of changes in quantities of material on hand at West Denver Store Yard.)

Cross-examination by Mr. Nye:

I would not attempt to make a valuation of these items myself.

Witness ARTHUR L. WATSON.

Direct examination by Mr. Dorsey:

Am purchasing agent and store keeper for the D. U. W. Co. I purchase tools, materials, supplies, etc. I should say that we have more tools on hand now than on Oct. 31, 1913 because we are buying all the time. As to general materials I leave the detail of that to the auditing department, but in passing through the yard the stock looks to me about the same as then.

No cross-examination.

Witness WALTER P. MILLER.

Direct examination by Mr. Dorsey:

Have been Secretary of the D. U. W. Co. since its organization in 1894 and have lived in Colorado 45 years. Was connected with the Citizens Water Company, for 6 or 8 months before the organization of the D. U. W. Co. By profession am an attorney-at-law. Am familiar in a general way with the history of the development of the waterworks system and the various companies from time to time engaged in supplying water in Denver. Printed pages 3-10 are substantially correct as to that history. Diagram on page 3 shows the chain of title of the property passing through the various companies. At the time of its organization the D. U. W. Co. acquired the properties of the American Water Works Company and the Citizens Water Company. The American Water Works Company having previously acquired the property of all the other companies operating and supplying water in the City of Denver except the Citizens Water Company. The stock of the South Platte Canal and Reservoir Company is all owned by the D. U. W. Co. except 7 directors shares. The matter appearing on pages 7 and 8 relating to securities issued by the different companies is an extract from the report of the engineers of the Public Utilities Commission made January 6, 1914. The South Platte Canal and Reservoir Company was organized before the D. U. W. Co. Pages 3-10 admitted as the detailed testimony of the witness.

244 Plate Number 1 is a map of the City and County of Denver reduced from an official large map. Plate Number 2 is a small map containing substantially the same information as Exhibit B. The coloring on Exhibit B indicates the division between the property owned by the D. U. W. Co. and the S. P. C. & R. Co. The S. P. C. & R. Co. generally owning all of the property from the Platte Canon Filter plant south to Lake Cheesman and the D. U. W. Co. owning all property from the filter plant north to and including the City of Denver except conduit No. 7. The D. U. W. Co. has owned the stock of the S. P. C. & R. Co. since June 10, 1899. Exhibit D is certified copy of articles of incorporation of the D. U. W. Co. Exhibit E. is certified copy of articles of incorporation South Platte Canal & Reservoir Company.

In addition to owning the stock of the South Platte Canal & Reservoir Co. the D. U. W. Co. also holds a lease to all of the property of

the S. P. C. & R. Co. Exhibit F. is a copy of the lease of the S. P. C. & R. Co. to the D. U. W. Co. The D. U. W. Co. also guarantees principal and interest on the bonds of the S. P. C. & R. Co.

Am also secretary of the S. P. C. & R. Co. I have charge of the matter of real estate, titles, records, etc., for both companies. Title deeds, etc., are in my custody. Pages 399-413 contain a list of the real estate and rights of way owned by the D. U. W. Co. and the S. P. C. & R. Co. on Oct. 31, 1913. The fee title to these lands stands in these companies except where it is in John Evans and William F. Hayden, Trustees. And one instance in the Littleton Milling and Water Power Company. The stock of which is owned by the D. U. W. Co. The D. U. W. Co. is the beneficial owner of all of the property however. Pages 399-413 admitted as witnesses' detailed testimony. Pages 413-416 contain a list of rights of way and so called water rights owned by the D. U. W. Co. Admitted as the detailed testimony of the witness. Pages 417-427 contain a list and description of lands and subterranean or percolating water rights owned by either the D. U. W. Co. or the S. P. C. & R. Co. Admitted as detailed testimony of the witness.

Direct examination by Mr. Hodges:

Am familiar with the water rights of the D. U. W. Co. and the S. P. C. & R. Co. Exhibit G. is a certified copy of decree of the District Court of Douglas County of the water rights of the Platte Canon Ditch. Offered in evidence, objected to by Defendants on the ground that the D. U. W. Co. and S. P. C. & R. Co. does not and cannot own title covered by these water rights. Admitted
245 subject to this general objection which is understood to apply to all of this proof. Exhibits H to O are certified copies of deeds conveying to the D. U. W. Co. title to lands and the attached water of the Platte Canon Ditch offered subject to general objection. (These deeds cover part of the first enlargement of the Platte Canon Ditch of 34 second feet and the second enlargement of 17.30 second feet as referred to in Exhibit G.) Both of the first appropriations, by construction amounting to 1.56 second feet and enlargement 17.30 second feet are also conveyed by Exhibit L. to Walter S. Cheesman by Phœbe Strong and Charles F. Strong and by Walter S. Cheesman to the D. U. W. Co. Exhibit P. is certified copy of the deed of the Citizens Water Company to the D. U. W. Co. conveying all of the property owned by it, including water rights. Since acquiring its claim to title in the Platte Canon Ditch the Water Company has used said water either for the water supply of the City of Denver or for the irrigation of lands owned by the company under the ditch. It has always used the water for the supply of the City of Denver during the non irrigating season to amount of 56 second feet. Beginning this use in 1889. During the irrigating season it has used the 52.86 feet which it bought for city supply and for irrigation. The Denver City Water Company appropriated 2.50 second feet of water for domestic purposes as of December 20, 1870 by the construction of the first water plant in the City of Denver. The Denver City Irrigation and Water Company appropriated 30 second

feet for domestic purposes as of Sept. 1878 by the construction of the West Denver Pumping station, and by the construction of the Mississippi Street Galleries. The Domestic Water Company appropriated 14.2 second feet for domestic purposes from Cherry Creek by the construction of diverting galleries and the pipe line in 1886. Which water has since been in continuous use except for one year when the pipe line was out of service being repaired. The Citizens Water Company in 1889 appropriated 12.38 second feet of water by the construction of infiltration galleries at Platte Canon and a 30 inch conduit to the City through which the water has since been used continuously. Proceedings for the adjudication of these rights are pending in cause known as No. 559 in the Douglas County District Court. The Citizens Water Company in 1892 appropriated 24.75 second feet by the construction of diverting works and a 34 inch pipe line from these works to the city. This water has since been used continuously. The D. U. W. Co. in 1899 appropriated 38 second feet by the construction of the Slow Sand filter plant and a 40 inch conduit leading from Platte Canon to the City. This water has since been used continuously. Proceedings for the adjudication of
246 these rights are pending in said cause No. 559. in Douglas County. The S. P. C. & R. Co. March 8, 1912 make an appropriation for 120 second feet by the construction of new intake works in Platte Canon and a 60 inch conduit leading to Marston Lake but claims the right as of Oct. 1, 1889 by virtue of a previous filing for a similar diversion by the Citizens Water Company right and title to which was conveyed to the D. U. W. Co. This water has since been used continuously. The D. U. W. Co. also has title to one second foot of water from the High Line Ditch at Platte Canon and for water for 20 acres from the High Line Ditch at Sullivan.

Title to all of the appropriations made by predecessor companies was transferred to the D. U. W. Co. by deed when it acquired the property of those predecessor companies. Exhibit Q is a certified copy of the decree for the water rights of Lake Cheesman granted by the District Court of Park County, State of Colorado. Offered subject to general objection. Exhibit R is certified copy of map and statement of claim for Lake Cheesman filed in the State Engineer's office by the S. P. C. & R. Co. Offered subject to general objection. Exhibit S is an enlarged copy of same.

Cheesman Dam was constructed by the S. P. C. & R. Co. Decree for the water rights was applied for and secured by that company. Water has been used by the D. U. W. Co. under its lease from the S. P. C. & R. Co. The D. U. W. Co. owns 100 out of 400 shares of the Harriman Ditch Company, owner of 4 decreed priorities out of Bear Creek and Turkey Creek amounting to 57.10 second feet. Water obtained under said shares is used by the company through Marston Lake. The water company also has the right to all surplus water carried by said ditch under appropriation of September 21, 1892 for storage and other uses in the irrigation and non-irrigation season. The D. U. W. Co. owns 110 out of 400 shares of the Soda Lakes Reservoir and Mineral Water Company, which has an appropriation for storage water out of Bear Creek claiming priority

as of February 11, 1893. Water obtained under said priority is used by the D. U. W. Co. through Marston Lake. The D. U. W. Co. owns 72 out of 400 shares of the Bergen Ditch and Reservoir Company's appropriation from Turkey Creek, the greater portion of which is not yet decreed. The D. U. W. Co. is the owner of Harriman Lake having an appropriation as of May 1, 1873, of 18.09 second feet and April 3, 1875 of 37.58 second feet.

The original rights for Marston Lake were acquired by the Citizens Water Company and the original rights to Harriman Lake by George W. Harriman but all were transferred to the D. U. W.
247 Co. Water from Marston Lake has been used altogether for city supply. Exhibits T and U are certified copies of decrees by the District Court of Douglas County for the Rough and Ready Ditch and mill rights owned by the Littleton Milling and Water Power Company, the stock of which company is owned by the D. U. W. Co. Exhibits T and U offered and admitted. The Denver Union Water Company is also owner of a decree granted the Denver City Irrigation and Water Company for 278.26 second feet for power purposes for the pumping plant at West Denver, appropriation September 10, 1878. The D. U. W. Co. is also owner of one-half of 56.71 second feet of water decreed to the Platte and Denver Canal and Milling Company as of October 7, 1864 for Power purposes. Conveyed to it September 1, 1910.

Water was first stored in Marston Lake in 1892 by the Citizens Water Company. The lake has been enlarged greatly since first acquired. Its storage rights are in adjudication, there having been no reservoir adjudication in that district since its acquisition.

Printed pages 15-19 contain a list of the water rights of the D. U. W. Co. and the S. P. C. & R. Co. regarding which I have testified. Admitted as detailed testimony of witness. Printed pages 20-21 contain copy of the official record of the precipitation at Denver and Lake Cheesman. (Admitted to be correct by Defendants.) Admitted as detailed testimony of witness. Exhibit V is a certified copy of map and statement of claim filed by the S. P. C. & R. Co. for the 60 inch pipe line. Offered and admitted.

Direct examination by Mr. Dorsey:

The waters which have come through the various rights acquired by the D. U. W. Co. and the S. P. C. & R. Co. as described have been used continuously since their acquisition in increasing quantities as the growth and development of the city demanded for domestic use and for irrigation of lawns and gardens, extinguishing of fires and general city purposes in the city of Denver and by the water company for the irrigation of its various farms and ranches. These uses have been continuous since the rights were acquired. Much of the water used for the city of Denver is used for manufacturing power and elevator purposes.

Cross-examination by Mr. Patterson:

In addition to acting as secretary of the D. U. W. Co. I also assisted our attorneys in legal matters. Am also secretary of the

Mountain Water Works Construction Company. (Objec-
248 tion by counsel as to examination concerning Mountain Water Works Construction Company overruled.) According to my understanding the Mountain Water Works Construction Company has not acted as holding company for either the D. U. W. Co. or the S. P. C. & R. Co. The Mountain Water Works Construction Company in 1894 became the owner of the D. U. W. Co. stock apportioned to the Citizens Water Company when the consolidation was effected. It received $1,250,000 of preferred stock and $4,000,000 common stock par value. At the same time there was issued $7,000,000 in bonds. The Citizens Water Company received its proportionate share of the bonds and the reorganization committee of the Denver Water Company and the Denver City Water Works Company its proportionate share. Bonds to the amount of $1,000,000 remained in the treasury to be used for additions of the plant. $2,500,000 of bonds went to the Citizens Water Company. $4,500,000 to the Reorganization Committee. The remaining million dollars of bonds was subsequently issued and used in new construction. The corporate life of the S. P. C. & R. Co. was extended subsequent to the expiration of its charter under the statute providing for one year of grace after the expiration of the corporation life of a company for renewal. The lease from The S. P. C. & R. Co. to the D. U. W. Co. is the basis of the right of the D. U. W. Co. to use the property of the S. P. C. & R. Co. but The D. U. W. Co. owns all of the capital stock of the S. P. C. & R. Co.

(Reading by Senator Patterson of provisions of the mortgage of the S. P. C. & R. Co.) I think after The D. U. W. Co. turns over to The S. P. C. & R. Co. its property in as good shape as received, except for the ordinary wear and tear, upon the expiration of the lease that it will have performed its obligation under the lease. The S. P. C. & R. Co. constructed the new pipe line to Marston Lake. No construction company was connected with The S. P. C. & R. Co. in connection with the building of Cheesman Dam or any of the pipe lines. The first money for the Cheesman construction was advanced by The Mountain Water Works Construction Company. With that exception it had nothing to do with the Construction work for The S. P. C. & R. Co.

The first water plant in Denver was located at 15th and Bassett Streets in 1872. In 1874 its capacity was 4,500,000 gallons daily. In 1878 this capacity was increased by the Denver Water Works and Irrigation Company constructing the West Denver Pump Station to 9,500,000 gallons daily and in 1882 by an addition to that plant to 14,500,000 gallons daily. In 1886 the Domestic Water Company,
a subsidiary of the two holding companies constructed the
249 Cherry Creek works. In the same year the Beaver Brook Water Company was organized to supply the town of Highlands and The Mountain Water Company to supply the town of Barnum, these companies were independent of the companies operating in Denver proper.

Up to that time the water supply was taken from the adjacent streams with no provision for storage. Appreciating the necessity

for an additional supply with reservoir storage, local stock holders discussed with Mrs. Archer who controlled the Denver Water Company a plan to go to the mountains for a water supply. Mrs. Archer refused to cooperate. Local stockholders then proposed to buy her stock or sell her theirs informing her that if they sold and proper provisions were not made for a water supply that they could carry out the plan to go to the mountains for an additional supply. As a result of this situation the Citizens Water Company was organized, constructed intake works and a pipe line 30 inches in diameter 23 miles long from Platte Canon to the north side of Denver from which the supply was distributed by gravity. Within 4 years it had constructed a second conduit 34 inches in diameter, 23 miles long, and installed the first artificial filtration plant west of the Mississippi river. Water for this conduit and filter plant was supplied by the rights purchased in the Platte Canon Ditch. The Citizens Water Company and the American Water Works Company of New Jersey were in competition until 1894. In April an agreement was reached between the parties for the purchase of the property by a new company to be organized. Rates for water service were not restored until after Oct. 1894. The Citizens Water Company during the competition supplied water free.

The American Water Works Company cut the rates, the Citizens Water Company met the cut, the American cut again and the Citizens offered water for nothing. I think water is supplied now for almost nothing. The old company cut rates first, it also supplied water free where consumers did not pay. Work was commenced on Cheesman Reservoir shortly after the organization of the S. P. C. & R. Co. in 1894. The first dam planned was a rock fill dam with a steel face in masonry. That dam was washed out in 1900 when it had been built to a height of about 50 feet. There was a small natural lake at the site of Marston Lake called Ford's Lake. In constructing Marston Lake the company took advantage of the contour of the ground, threw the earth work around and impounded the waters, excavating the material to form the dam or embankment. The D. U. W. Co. owns $888,000 of the bonds of the S. P. C. & R. Co. (Objection to Interrogation along this line overruled.)

250 Money was advanced by the D. U. W. Co. for construction work and the bonds were taken in payment. The company became the owner of these bonds after the mortgage was executed, of course. Work had been going on at Lake Cheesman before 1897 but probably not on the dam. Construction of dam was completed in 1904. The bonds were issued and mortgage given by the S. P. C. & R. Co. in 1903. Up to this time the D. U. W. Co. had been furnishing the money for all of this work. The D. U. W. Co. paid $150,000 for the capital stock of the S. P. C. & R. Co. (Objection overruled.) The mortgage of the S. P. C. & R. Co. was dated May 1, 1903 and the bonds June 1, 1903. I think the records of the Auditor's office would show the delivery of those bonds better than my records. The bonds were delivered to the D. U. W. Co. from time to time as advances were made. The D. U. W. Co. did not withdraw any bonds until 1905, they then withdrew a million dol-

lars which were sold at once. The sale was made by the D. U. W. Co. of the bonds turned over to it. I practically negotiated the sale of the first million dollars.

Bonds of the S. P. C. & R. Co. were sold to pay for the construction of the new 60 inch pipe line, which work was done by the D. U. W. Co. The West Denver lands, the title of which is in Evans and Hayden Trustees, are used in connection with the water power for the West Side Pumping Plant. They were conveyed direct to the trustees by Mr. Underwood, representing the Reorganization Committee. Title was placed in trust because it was thought that the lands might be disposed of to be used for purposes other than water works purposes, but it has been found impossible to do away with the West Denver works. Whether the mortgage of the D. U. W. Co. covers the stock of the Littleton Milling and Water Power Company and the S. P. C. & R. Co. is a legal question. I have forgotten how much land was acquired with the first rights purchased in the Platte Canon Ditch, 300 or 400 acres possibly. 1902 is the only year in which the Platte Canon Ditch has been shut off because of scarcity of water. There never has been any litigation concerning the claims of the company under the Platte Canon Ditch. Two men, named Hugins and Shellabarger have rights to irrigate 195 acres which are recognized by the company. We have used all of the water of that ditch in the non-irrigating season.

I don't believe any steps were necessary to change that from an irrigation to an all-year-round use except to use the water for the new purpose. The all year round use was initiated in 1889 or 1890. The original intake of the Platte Canon ditch is still in use for carrying water to the ranches and for part of the city supply. Most of the city supply comes through the conduits.

251 Application for a decree for a change of point of diversion of this ditch to the conduits is now pending in the district court of Douglas County. The case has been pending since 1904 or 1905, being known as cause No. 558. We claim the total appropriation of the Platte Cannon Ditch 56 second feet for use during the non-irrigating season and 52.86 for use during the irrigating season. During the non-irrigating season we use all of the first appropriation 4.70, anl during the irrigation season 1.56 second feet. The right to the full supply during the non-irrigation season was initiated by taking and using with the consent of the owners in 1889. The original appropriation for the first water plant has never been discontinued. It is now used through the Mississippi Street galleries. The only step taken or necessary to be taken to change the point of diversion was the physical act of taking the water at a new point of intake. The right to change was never called into question by court proceedings.

We claim an appropriation of 30 cubic feet for the Mississippi Street galleries through the same conduit that carries the original 2.50 second feet. The Mississippi Street galleries were first used, I think, in 1879. The proceedings for the adjudication of the domestic rights were instituted in Douglas County immediately after passage of the statute authorizing such proceedings. The Galleries

were constructed at Platte Canon in 1889. I think no filing was made for this water because the law did not permit of any. A statement of claim has been filed in the adjudication suit that is still pending.

Appropriation of 24.75 second feet for the thirty-four inch conduit and 38.8 second feet for the 40 inch conduit was made in the same manner by construction and taking of water. The law under which filings could be made for such purposes did not go into effect until 1903. Statement of claim was filed in the State Engineer's office March 8, 1912, for the 60 inch line. 120 second feet is the full capacity of that line. The list introduced covers all of the water rights owned, leased or used by the D. U. W. Co. in furnishing a water supply to Denver. It has no leases or contracts for water supply except from the S. P. C. & R. Co. Marston Lake was often filled from the Turkey Creek and Bear Creek rights. Court proceedings have not actually been started for the adjudication of the enlargement of the Harriman Ditch. The enlarged capacity has been used, whenever the water was available, ever since 1892. The enlargement was for both domestic and irrigation purposes.

The Archer Lake and Platte and Denver Ditch rights are for power purposes. The Platte and Denver Water is used
252 through the Archer Canal. None of it is used for domestic supply. Rights acquired by the Water company which were originally irrigation rights have been used in part for irrigation and in part for domestic supply. Since 1894 new rights have been initiated by the construction of two or three conduits and by the purchase of Harriman Ditch, Soda Lakes, and Bergen Ditch rights, evidenced except the Harriman Ditch enlargement, by stock in the Companies. They were acquired as a matter of precaution to add to the water supply. The company now irrigates no land under the Harriman Ditch. It disposed of the Harriman Ranch and retained the water supply representing one-fourth of the supply of the Harriman Ditch. The Harriman rights were converted into domestic or all-year-round-use, simply by using them through Marston Lake. The Harriman Lake never has been used for domestic supply but can be used through Marston Lake any time. Large extensions of the distribution system were made with the million dollars in the treasury of the D. U. W. Co. after its organization. Part of that money may have been used in construction of Lake Cheesman. The Mountain Reservoir (Strong) never was used. It was acquired by the Citizens Water Company for reservoir purposes. Much money was spent on it. The Water company recognizes the season in which water is needed for growing crops as the irrigation season.

There is a statute that requires an irrigation company to supply water from such a date in the spring to such a date in the fall.

Redirect examination by Mr. Dorsey:

The term consolidation used in respect to the formation of the D. U. W. Co. in 1894 applies to a property and not a corporate consolidation. The D. U. W. Co. purchased the properties of the Ameri-

can Water Works Company and the Citizens Water Company. The capital stock of the S. P. C. & R. Co. was acquired by the D. U. W. Co. June 10, 1899. Lands to which title is in Evans and Hayden trustees are expressly excepted by the mortgage of the D. U. W. Co. The lands appurtenant to the water power of the West Denver station constitute a majority of the property so held. The change of use from irrigation to all-year-round use of the Platte Canon Ditch right effective since 1889 never has been questioned by anybody. It has been known and recognized by all interested parties including the state engineers and water commissioners. Power water has not and could not be used through the pipes for consumers. The Platte Canon Ditch was shut off from the latter part of July to September
21, 1902, because there was not enough water in the river to
253 supply even the first appropriation from the river during that period.

I have been familiar and connected with water rights and water supplies in Colorado since 1875. 1902 was the driest year in the stream flow history of Colorado. All of the Harriman Ditch water is used for city supply. Harriman Lake in a sense supplements the city supply because certain contracts made by George W. Harriman to supply others with water from his rights have been shifted by us to Harriman Lake so they do not interfere with the Harriman Ditch rights.

Recross-examination by Mr. Nye:

The D. U. W. Co. in 1894 purchased part of its property from the Citizens Water Company and part from William A. Underwood who represented the Reorganization Committee. He had purchased the property of the American Water Works Company at Master's sale. This purchase included the rights and equities of the holders of securities of the Denver Water Company, The Denver City Water Works Company, and the American Water Works Company. And included the underlying mortgages of the Domestic Water Company, The Beaver Brook Water Company and the Denver City Water Company. There were two sales, one under the Denver Water Company mortgage the other under the Denver City Water Works Company mortgage, both purchases were by Underwood.

Witness W. P. MILLER recalled.

Direct examination by Mr. Hodges:

Exhibits BB and CC are certified copies of filings made by the S. P. C. & R. Co. in the office of the Register of the United States Land Office at Denver for right of way on the public domain for Lake Cheesman Reservoir. First filing was made in 1895 and under the law which gave the company five years to complete its work. Second filing was made in 1900 and proof made of litigations, etc., that delayed the completion of the work. Offered and admitted. Exhibit DD is a certified copy of the articles of incorporation of the Arnett Ditch Company. Offered and admitted. Exhibit EE is a

certified copy of the articles of incorporation of the Harriman Ditch Company and extension of its corporate life. Offered and admitted. Exhibit FF is a certified copy of the deed from the Arnett Ditch Company to the Harriman Ditch Company. Offered and admitted. Exhibit GG. are copies of the stock certificates of the Harriman Ditch Company owned by the D. U. W. Co. Offered and admitted.

Exhibit HH is a certified copy of the decree of the District
254 Court of Arapahoe County for Water appropriations in Water District No. 9. The decree was entered in 1884. Since the decree was entered there has been an enlargement of the Harriman Ditch. Offered and admitted. Exhibit II, is a certified copy of the statement of claim filed by the Harriman Ditch Company in the office of the State Engineer, Sept. 21, 1892, making an additional appropriation from Bear Creek for the Harriman Ditch and its stockholders to fill nineteen reservoirs, including Marston Lake. The claim being for the unappropriated waters flowing in Bear Creek in the irrigating and non-irrigating seasons. Offered and admitted. A copy of said statement of claim was also filed in the office of the Clerk and Recorder of Jefferson County. Immediately upon the filing of the claim, work was commenced to enlarge the ditch to a carrying capacity of 125 cubic feet per second. The work was executed by the Citizens Water Company for the Harriman Ditch Company. The Ditch has since carried the full appropriation whenever water was available. The water derived by the Water company under its interests in the ditch has been put into Marston Lake and used for city supply.

The water company owns the one-fourth interest in the Harriman Ditch which entitles it to one-fourth of the water supply at all times. It has a further interest under contracts with the Harriman Ditch Company entitling it to any surplus supply that may not be needed by the other users under the ditch. This is over and above its one-fourth interest.

Exhibits JJ, KK, LL, are copies of three contracts which have been in effect covering this water supply. JJ, and KK, were between the Harriman Ditch Company and the Citizens Water Company. LL, between the Harriman Ditch Company and the D. U. W. Co. The waters of the Harriman Ditch Company have been constantly used for irrigation purposes except the portion belonging to the D. U. W. Co. which has been used for city supply. This city supply began with the first contract between the Harriman Ditch Company and the Citizens Water Company in 1892. The records of the use of water through that source for city supply are in Exhibit C. at page 32. Exhibits JJ, KK, LL, offered and admitted.

Exhibit MM, is a copy of the certificate of incorporation of the Bergen Ditch Company offered and admitted. Am not familiar with the titles of the Bergen Ditch Company except with the appropriation decreed in Exhibit HH, numbered 18, priority No. 27. The ditch has since been enlarged. Water decreed to the Harriman Reservoir on page 25, of Exhibit HH is carried through the Harriman Ditch. Exhibit NN, is a copy of the certificate of incorporation

of the Soda Lakes Reservoir and Mineral Water Company.
255 Offered and admitted. Exhibit OO is a certified copy of the map and statement of claim filed by the Harriman Ditch Company in the office of the County Clerk of Jefferson County, Feb. 11, 1893., making an appropriation of water for the Soda Lakes Reservoir. Offered and admitted. Exhibit PP is a certified copy of the deed by the Harriman Ditch Company to the Soda Lakes Reservoir and Mineral Water Company, conveying the Soda Lakes Reservoir and claim for water under Exhibit OO. Offered and admitted. Water under said filing has been stored in said reservoir, then used for irrigation except the water owned by the D. U. W. Co. which has been run from Soda Lakes to Marston Lake through the Harriman Ditch. The D. U. W. Co. owns 110 out of 400 shares of the Soda Lakes stock. Soda lakes takes water from Bear Creek. Harriman Lake from Turkey Creek, The Bergen Ditch from Turkey Creek. Water decreed the Harriman Lake has been used continuously for irrigation. Harriman Lake has been enlarged since the decrees were entered in 1884. Obtains part of its water under the enlargement of Harriman Ditch. The D. U. W. Co. acquired Marston Lake from the Citizens Water Company, which acquired the original plot of ground from James Marston. Subsequently purchases were made from Bowles, Skelton and others of land sufficient to make it as large as it now it.

There is no specific decree for Marston Lake. Water was first stored there in 1892 or 1893. Since then it has always been used for city supply. The lake is many times larger now than when storage was first made. Construction work was completed on it in 1902. Exhibit QQ is a copy of the articles of incorporation of the Littleton Milling and Water Power Company and extension of its corporate life. Offered and admitted. Exhibit RR is a copy of the certificate of incorporation of the Denver City Water Works Company. Offered and admitted. Exhibit SS is a copy of certificates of incorporation of the Denver City Water Company and of the Denver City Irrigation and Water Company. Also articles of consolidation of the Denver City Water Company and Denver City Irrigation and Water Company, into the Denver Water Company, and an amendment thereto. Offered and admitted. Exhibit TT is a copy of certificate of incorporation of the Domestic Water Company. Offered and admitted. Exhibit UU is a copy of certificate of incorporation of the Mountain Water Company. Offered and admitted. Exhibit VV is a copy of the certificate of incorporation of Beaver Brook Water Company and an amendment thereto. Offered and admitted. Exhibit WW is a copy of certificate of incorporation of the American Water Works Com-
256 pany. Offered and admitted. Exhibit XX is copy of articles of incorporation of the Citizens Water Company, and renewal thereof. Offered and admitted.

Redirect examination by Mr. Dorsey:

I have personal knowledge regarding a few of the items of expenditure shown on Exhibit Z. The item of $10,500 for stock of

the Soda Lakes Reservoir and Mineral Water Company was in payment for stock in that company purchased by me for the D. U. W. Co. in 1910. Items of $12,500, $1090, $91, expended in 1910-11-12 were for the acquisition of a one-half interest in the Platte and Denver Ditch Company's Ditch known as the Mill Ditch. Items $1620. $252. in 1911 and '12 for Bergen Ditch Water rights, were in connection with the enlargement of the Bergen Ditch and Reservoir Company's property. Am familiar also with the sales of real estate shown on Exhibit Z resulting in separations from the plant as appraised in 1908 of property for which the company received $40,547.20 subject to deduction of $269.30 for expenses leaving the net amount received $40,277.90. The amount received for all of the real estate was something like $4,000 more than the appraisement.

All of the items sold for the appraised valuation or better, except two parcels that were condemned for city purposes. 750 acres of the Harriman Ranch were sold as dry land for $28,250. The water rights were retained and 130 acres of land surrounding Harriman Lake. All of the ranch lands of the company were acquired in order to obtain the water rights connected with them. The Platte Canon Ditch rights were obtained in connection with the Platte Valley ranches. The Strong or Mountain Reservoir Site, is entirely independent of the Strong Ranch. The company still owns the Platte Valley ranches and has retained them to preserve and continue the use of the water rights derived with them at the times when all of the water is not needed for city purposes. The water is taken from the ranches whenever it is all needed for city purposes, but in order to keep the full amount of these water rights constantly applied to a beneficial use it is necessary to maintain the ranches.

The company was able to dispose of the Harriman Ranch because it is able to use all of the water available from Bear Creek for domestic purposes, at all times. The conduits of the company pass through the Platte Valley ranches as indicated on Exhibit B. The company acquired the Littleton mill property in 1903, as a protection to both the summer and winter flow of the Platte Canon Ditch. The
257 right for the mill being earlier than the rights of the Platte Canon Ditch and could demand the water in times of shortage if owned by other parties. Ownership of that right also protects the company against claims against the Platte Canon rights by the Nevada Ditch which are earlier than some of the Platte Canon Ditch rights but later than the Rough and Ready rights. In order to keep this right alive it is necessary to operate the mill. The Platte and Denver Ditch right is valuable for the benefit of the Mississippi Street gallery rights in the same manner. The Strong Reservoir site was acquired before the discovery of Lake Cheesman. Considerable money was spent on it. There are 8436.10 acres in the Lake Cheesman Site. 7,636.10 acres were conveyed by the United States Government by special act of Congress. All of submerged acreage is included in that act. 800 acres were purchased from the State of Colorado. Prior to obtaining this 7,636.10 acres, the company had

filed on a reservoir site at this location. First filing made Oct. 8, 1894. Second filing April 12, 1900. Those filings covered 800 acres approximately.

The patent issued under the special act covered the land also included under those filings. 250 to 300 acres of this land was also covered by title obtained through the Olive and Estella Placer claims and an additional acreage through other placer claims, for which patent was obtained before the blanket patent covering all of the land was applied for. The company paid the United States $1.25 an acre for all of the land described in the patent notwithstanding the fact that it had other title and other rights to a large portion of it.

The land purchased from the State of Colorado was not covered by the United States patent. Exhibit ZZ, is a copy of the franchise from the city of Denver to the Denver City Water Company, dated Dec. 16, 1870. Offered and admitted. Exhibit A1 is a copy of the franchise from the city of Denver to the Denver City Water Company dated May 9, 1874, succeeding exhibit ZZ. Offered and admitted. Exhibit A2 is a copy of the franchise granted the Citizens Water Company by the City of Denver. Offered and admitted. Exhibit A3 is a copy of ordinance No. 44, 1890, a franchise granted the Denver Water Company by the City of Denver, April 10, 1890. Offered and admitted. Those are copies of all of the franchises that have existed between the city of Denver and the various water companies that have served it except that different companies had contracts with small municipalities originally independent and now a part of the City and County of Denver, which contracts were assumed by the City and County of Denver until their expiration. There is also the lease of the City of Denver to the Denver Union Water Company for the use of the water system in South
258 Denver. The franchises of the Citizens Water Company and the Denver Water Company ran concurrently.

The Citizens Water Company and the American Water Works Company successor of the Denver Water Company were in competition from 1891 until 1894. One result of the competition was large reductions in water rates and ultimately the furnishing of free water. Schedule A of water rates is the schedule that was attached to the franchise of the Denver Water Company. Competition ceased between the companies April 6, 1894, when an agreement was made for the purchase of the properties of the two companies by a new company to be formed.

The Denver Union Water Company acquired the property and franchises of the two companies in Oct. 1894. It chose to operate under Ordinance 44, series of 1890. It restored the rates of Schedule A, except the $10 per lot rate for lawn irrigation which was reduced to $5.50 per lot. Those rates remained in effect until the next year when a controversy arose over the provision of the ordinance that in April 1895 the rates should be reduced to the average of the rates of Cincinnati, St. Louis and Chicago. A number of rate schedules were proposed by the company, none of which were accepted by the City Council. After the then mayor had advised the people not to

pay the rates charged by the company and offered to furnish keys with which to turn on water if it was turned off to enforce payment the city brought suit against the company to require it to make the reduction contended for. Meanwhile ordinances were enacted providing penalties against officers and employes of the water company should they attempt to enforce collections under the then existing schedule. Enforcement of these ordinances was enjoined in a suit brought by the Continental Trust Company against the city of Denver and in the United States Court in St. Louis before Judge Thayer, that injunction was made permanent. The suit to require a reduction in rates was begun May 21, 1897. Nine months were consumed in the trial of the case which finally was decided by the Supreme Court of Colorado in 1907. The leaflet schedule under which the company is now operating was the schedule that was offered as a compromise in connection with this rate controversy. After the case was decided by the Supreme Court, the Leaflet Schedule was put into effect.

After the D. U. W. Co. came into possession of the property of the old companies litigation developed with Clarence H. Venner and others attacking the foreclosure proceedings which was carried through the courts for years. Some of the cases were in the Federal Courts, some in the State Courts. Some in the Courts of New Jersey. One case went to the Supreme Court of the United
259 States, and was finally decided in 1910. The water company was successful in all of this litigation. After the decision of the Supreme Court of the United States in 1910 other litigation on behalf of Venner was begun in 1912 and '13. The Venner litigation involved the title of the company to its property. The litigation with the city and others related to the question of rates and to pressure and purity of the water supply.

There was also litigation over the adjudication of water rights and in 1900 an injunction proceeding to restrain the city from issuing $4,700,000 bonds to build a competing plant. Also litigation with the Colorado and Southern R. R. and others arising from flood damage caused by the failure of the first Cheesman Dam which was washed out by a flood. Then came the appraisal of 1907 in which legal expenses were incurred and following that the Suit of the New York Trust Company against the City and County of Denver respecting Ordinance 44, of 1890.

Before I became connected with the D. U. W. Co. I was for many years connected with the Colorado Mortgage and Investment Company. (Objection to inquiry as to interest rates overruled. Exception.) From 1869 to 1875 the prevailing interest rate was 2 per cent per month, from 1875 to 1880 12 per cent per annum and on especially valuable security 10 per cent. From 1880 to 1885, 8 per cent, from 1885 to 1890, 8 per cent, from 1890 to 1895 some money was loaned at 7 per cent but no good loans at less than 8 per cent. From 1894 to recent years farm loans ran from 6 to 7 per cent and on approved security in the city 6 per cent as the minimum.

(On Motion of Mr. Nye, testimony of the witness Miller concern-

ing interest rates prevailing prior to the incorporation of the D. U. W. Co. in 1894 was stricken out as incompetent, irrelevant and immaterial, and not within the issues of this case. Exception.) The Olive and Estella placer claims contained 254.825 acres, the Canon Lode and Mill Site, 15.331 acres. The Watson Placer 86.327 acres. A total of a little over 356 acres. The Olive and Estella Placer claims had been filed upon and partially developed by others. The S. P. C. & R. Co. bought out the claimants. The S. P. C. & R. Co. caused the other claims to be filed upon to cover the dam site and spillway. The S. P. C. & R. Co. caused the necessary development work to be done so that it obtained patents to those claims for the purpose for which filings were made.

Exhibit A5 contains a list of lands acquired by the water company from Jan. 1, 1908 to Oct. 31, 1913. They are lands not included in the 1907 appraisal and now owned by the water
260 company. The consideration is not on the list but can be supplied. Exhibit A.5. Offered and admitted. Exhibit A.6 is a list of rights-of-way for conduits acquired from Jan. 1, 1908, to Oct. 31, 1913, not included in the 1907 appraisal. They are now owned by the water company. Exhibit A.6. Offered and admitted. The lands are listed under the number of the conduit or item of property with which they are connected. The costs of these lands is included in Exhibit Z.

Cross-examination by Mr. Nye:

Exhibits BB, and CC, will themselves show the date of filing. CC. was executed Oct. 8, 1894, approved by the Secretary of the Interior, Aug. 14, 1895. Exhibit BB was filed April 12, 1900, approved by the Secretary of the Interior, July 3, 1900. I was in error in my direct testimony as to the time of those filings. The Citizens Water Company was not a stockholder of the Harriman Ditch Company when the claim to enlargement was made in 1892. It was interested under the first contract with the Harriman Ditch Company, which was made about the same time. The Citizens Water Company enlarged the ditch, the increased capacity being made necessary by the enlargement claimed. The ditch has since carried its full capacity to Marston Lake and other reservoirs whenever water was available. An enlarged use for irrigation purposes was made from that time, more land being put under cultivation. The increased use by the stockholders, other than the water company was for irrigation. I don't know what portion of the enlarged capacity is necessary to carry the irrigation rights. The first few years after it bought the Harriman Ranch the water company attempted to farm it and use part of the water for the ranch, then finding it needed it all for city supply it gave up supplying water to the ranch. I don't know just how long it is since we ceased using any water for irrigation for the ranch. No portion of the right has been used for irrigation since the sale of the land. The Harriman Ranch was acquired by the D. U. W. Co. May 17, 1897. Marston Lake is located several miles from the Harriman Ranch. The Marston Lake site was originally acquired by the Citizens Water Company. I don't know what

the cost to the company of the site was. The books will show. Since my connection with the company several pieces of land have been purchased at prices of $100, $150, $175, an acre. It is my recollection that $150 an acre was paid for the land that was condemned. I can ascertain what the reservoir site cost.

The rights of Marston Lake are subject to decree and can be decreed. No petition has been filed for a decree. In conveying their properties to their successors the different predecessor com-
261 panies of the D. U. W. Co. generally executed more than one deed. Real estate being conveyed by instruments separate from rights of way, water rights, franchises, etc. The transfers were all made at the same time however. The Platte and Denver Ditch is not now used except to irrigate a little land near the headgates. We bought only the power right and transferred our half into Lake Archer. The headgate of the Platte and Denver Ditch is about two miles from the Archer Canal. We have not applied for a decree changing the point of diversion. The matter is open now in a suit pending in Douglas County. We acquired one-half of 56.71 second feet. We have made use of the water ever since we purchased it. The right was simply added to the existing power rights of Lake Archer which were increased to the extent of that purchase. Referring to the real estate separated from the plant since the former appraisal, Block 7 Weir's Addition was sold for $1,200. Plats, 2, 7, and 8 Block 38 East Capitol Hill, was condemned by the city, we were awarded $597.20. Lot 19, Block 33, Witter's First Add. also was condemned for street purposes, we were awarded $500. The Alameda Avenue Tank Site was sold for $10,000. 750 of the 880 acres of the Harriman Ranch was sold as dry land for $28,250.

The board of appraisers fixed the value of the Harriman Ranch 880 acres including the Harriman Reservoir and the works creating it, with surplus water for the ranch at $40,300. I was familiar with the Platte Canon ranches before their purchase by the water company. The Frank Archer ranch is in a higher state of cultivation now than before the purchase. The other three are not. The first priority of the Rough and Ready Mill Ditch for 37 second feet is dated Dec. 31, 1860. The second priority is dated Dec. 31, 1867. Only the first priority prior to the Platte Canon and Nevada Ditches, and is the one that is important in protecting the rights of the Water company. 840.224 acres for the Marston Lake reservoir site were purchased between Dec. 22, 1892 and Feb. 20, 1911 for a total direct consideration of $87,867.15. The dates of purchase, grantors, and purchase prices paid are as follows:

December 22, 1892, purchased of H. W. Lake, 88.03 acres, $11,003.75; on the same date purchased of J. W. Bowles, 106.67 acres, $13,333.75; March 8, 1894, purchased of Lucy G. Elliott, 28.59 acres, $4288.50; August 10, 1894, purchased of F. S. Meston, 320 acres, $27,200; purchased on March 28, 1894, condemnation suit, Trout Lakes, and so forth, Company, and Boyd Skelton, 120.90 acres, $18,175; and on the same date, I think, purchased of J. W. Bowles, 8.28 acres, $1035; and another tract, of the same party, 2.45

acres, $306.25; another tract of the same party, 42.11 acres, $5263.75. Another tract from the same party, 2.14 acres, $267.50. Au-
262 gust 14, 1898, purchased of Lucy G. Elliott, 28.44 acres, $1457.50; January 31, 1900, purchased of Lucy G. Elliott, 6.57 acres, $328.50; February 26, 1901, purchased of J. A. Osner, .215 acres, $64.50; about the same time, although the date is not here, perhaps the same day, purchased of J. W. Bowles, 16.84 acres for $850; and another tract from the same party, 67.28 acres, $4,036.80; February 20, 1911, purchased of J. A. Osner, 1.709 acres, $256.35, making a total of 840.224 acres, for $87,867.15.

All the purchases prior to Oct. 1894 were made by the Citizens Water Company, and conveyed to the D. U. W. Co. by the deed in this case as an exhibit. There was an advantage to the D. U. W. Co. in transferring the point of diversion of the Mullen Ditch from a point above the Mississippi Street galleries to a point below them as protection to the gallery rights. Work ceased on the Strong reservoir site at the time the Cheesman site was discovered. The use of the Strong site has been postponed until additional reservoir capacity is needed. It would have to be supplied by the construction of a long canal or pipe line from the Platte River. The diversion would have to be made about at the junction of the North and South forks. I don't remember the price paid for the state lands purchased for Lake Cheesman.

There were ten original locaters of the Olive and Estella Placer claim. I think it cost us about $15,000. to acquire the interest of the claimants, then we did the annual assessment for patent work, and were in litigation with B. P. M. Kimball over a 3/10 interest in the claim. Finally we bought him out and got the title. This was all done before we applied to Congress for the blanket patent. I will produce all of the information that I can concerning the original cost of Lake Cheesman Land. Parts of the lands were acquired by the Mountain Water Works Construction Company and I don't know whether we have those early books.

When the D. U. W. Co. was organized it acquired the franchises of the Citizens Water Company and the Denver Water Company. It chose to operate under the franchise of the Denver Water Company. The Citizens franchise was involved in litigation.

The Venner litigation involved the D. U. W. Co. directly, attacking of the property which it acquired except that acquired from the Citizens Water Company. The leaflet schedule originated in 1895. It was not in effect between 1898 and 1907, when a schedule provided by court decree was in effect. The leaflet schedule was in effect during the trial of that case, and suspended upon the entry of the decree of the District Court. I don't know whether all of the expense of litigation has been charged to operation or not,
263 that is not in my department. An injunction was issued by the Federal court in 1900 on complaint of Fanny Josephine Grant restraining the issue of $4,700,000 of bonds by the city, for the construction of a competing water plant. The case was not appealed and the city destroyed the bonds. The lands held by Evans and Hayden trustees include the lands in Lake Archer

but not all of the lands shown on Exhibit A. 4. They are listed by specific description in Exhibit C. The lands are now subject to the mortgage. They were put in the trust to enable us if we saw fit to sell the lands to reduce the mortgage indebtedness.

Cross-examination by Mr. Patterson:

We do not claim that we can divert the water of the Rough and Ready Ditch for domestic or city purpose. It serves to protect us against the rights of the Nevada Ditch that are prior to the Platte Canon Ditch. The Platte Canon Ditch rights are part of our domestic rights. The Denver City Irrigation and Water Company constructed Lake Archer. It was originally built to furnish both power and water. None of the water is now used for domestic purposes. Water for domestic purposes is obtained from the Mississippi Street galleries. The water from the Mississippi Street galleries does not run into Lake Archer. It never did.

The auditor's office is working on the cost of the purchases in connection with Lake Cheesman it will be several days before it can be gotten out. The water rights of the company which have been purchased as distinct from those obtained by filing are the Platte Canon Ditch rights, Soda Lakes rights, Harriman Ditch rights, Bergen Ditch rights, the Rough and Ready Ditch rights and the Platte and Denver Ditch rights. The Platte Canon rights were bought in connection with the William and Phebe Strong and the Becky and Frank Archer Ranches, four distinct holdings. The Platte Canon reservoir site was bought from Abba T. Titcomb, by the S. P. C. & R. Co.

The land cost from $100 to $200 per acre, I have forgotten the exact price. I do not know what the construction of the reservoir cost. Our books will show. We purchased a water right of one cubic foot per second in the High line ditch with that land. The stock in the Harriman Ditch was bought with the Harriman Ranch for which we paid in the neighborhood of $50,000. We paid something like $17,000 for the Rough and Ready right. The water company as a consideration for the surplus water of the Harriman Ditch enlarged the ditch and maintains and operates it. I don't know how much the enlargement cost. I don't know anything about the item of discount on bonds in Exhibit Z.

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The prevailing rates of interest from 1895 to 1900 were 6 and 7 per cent, I have heard that some insurance companies made some loans on especially good security at 5 per cent but that was not the prevailing rate. I don't know of any loans made here at 5 per cent within the past two years. The lands, the title of which was in Evans and Hayden trustees, were subject to sale if it was determined by the water company that they could be spared and sold.

The lands covered by Lake Archer are part of the trust. Some other scattering lands and lots were also in the trust. (Descriptions of the lands included in the trust.) Argument over attempt of Senator Patterson to cross examine witness concerning right of way testimony given by witness Abner T. Young. Block 1, East Denver was part of the land under the original trust. I don't remember whether

we have sold the right of way extending from the West Denver Station to the old 15th Street pumping station. I don't remember any land being sold to the Denver North Western and Pacific Railroad except that block 1 East Denver. I do not know whether there is a plat available showing the property owned by the D. U. W. Co. immediately after its incorporation.

Redirect examination by Mr. Dorsey:

The amount realized from the sale of 750 out of 800 acres of the Harriman Ranch was $28,250. The valuation put upon the entire 880 acres as dry land including improvements, by McNeal and Sanborn was $23,478. The total value which the appraisers in 1908 placed upon the ranch with rights to surplus water and including the Harriman Reservoir complete was $40,300. So that there remains out of that appraisal to cover the water rights the 130 acres of land and the Harriman reservoir complete just about $12,000. The amounts testified to as having been paid for the Marston Lake lands were simply the purchase price or condemnation price paid directly to the land owner and they include nothing for the expense of collecting the land, legal, expenses, commissions, or anything of that sort, nor do they include taxes, or other carrying charges prior to the time when the lake went into service. Most of the purchases were made in 1894. The lands have increased in value very much since that time. The same is true as to the testimony regarding the lands for Lake Cheesman.

The Mountain Water Works Construction Company was not the construction company for the S. P. C. & R. Co. They were simply the owners of the site, and paid out some of their money for the acquisition of the site before the D. U. W. Co. purchased the stock of the S. P. C. & R. Co. The Mountain Water Works Con-
265 struction company never did any actual construction work for the S. P. C. & R. Co. It opened the portal of the tunnel at Lake Cheesman and built a small power ditch from Goose Creek to the site of the dam that was afterward abandoned.

Aside from that they simply put up the money to acquire the lands and made the surveys. The D. U. W. Co. purchased the stock of the S. P. C. & R. Co. from the Mountain Water Works Construction Company June 10 1899. The purchase price was $150,000. Up to that time the Mountain Water Works Construction Company had simply acquired the land and cleared some of the timber off the reservoir site. The cost to the D. U. W. Co. of acquiring these lands in the condition they were in was $150,000.

At the time of that purchase the S. P. C. & R. Co. had its filing on the Lake Cheesman site, had title to several mining claims and 640 acres of land purchased from the state. It had done practically no construction work. Its possessions around Platte Canon were acquired some years afterwards. After the purchase of this stock by the D. U. W. Co. the S. P. C. & R. Co. acquired at Lake Cheesman the additional 160 acres of state land and all of the land it acquired under the special act of congress. Construction work was completed at Lake Cheesman in 1904. The investment of $150,000

was practically idle capital from 1899 until 1904. The franchise of the Citizens Water Company was granted on the express condition that it should not sell out its plant, rights or privileges to or consolidate with or pool rates with any other water company furnishing water in the City of Denver. That was the principal reason why the Denver Union Water Company did not adopt that franchise. One of the reasons for the value to the company of ownership of the Rough and Ready Ditch arises from the provisions of the law under which the use of the Platte Canon Ditch was changed from irrigation use to an all-year-round use. The law requires that such change must be without damage to anyone. The Rough and Ready ditch being prior in time to the Platte Canon Ditch could claim such damage, if controlled by other owners. It would have been impossible for the Platte Canon Ditch to have perfected its right to the use of water during all of the non-irrigating season without that control of the Rough and Ready Ditch.

Recross-examination by Mr. Nye:

Marston Lake was in service and being used before it was completed to its present capacity. Use began in 1894 or 1895.
266 A little water was used from Lake Cheesman in 1903-04 before it was completed. We did not use any water from Lake Cheesman in 1902. There was a little stored there but we purchased emergency supply elsewhere wherever we could, holding that for a final reserve. The Citizens Water Company franchise was forfeited by the act of selling the plant to the D. U. W. Co. The Littleton Mill is frequently shut down in winter when all of the water in the river is needed to supply the Platte Canon Ditch demands for city purposes.

Witness W. P. MILLER Recalled.

Recross-examination by Mr. Nye:

93 acres of land purchased for the Platte Canon Reservoir cost $8,316, including a water right of 1 second foot in the High Line Canal. The purchase price of the Harriman Ranch was $34,808.50. The contract price was $40,000, but the company was allowed a credit for work to be done on Harriman Lake. Which work was carried out so that in effect the purchase price was $40,000. That included land and water rights. Objection by Mr. Dorsey overruled. Exception. Defendants' Exhibit 18 shows the dates of withdrawal and the amounts of the bonds of the S. P. C. & R. Co. withdrawn by the D. U. W. Co. from time to time.

Redirect examination by Mr. Dorsey:

85.25 acres of the Titcomb land was purchased Jan. 5, 1903. 7.7 acres were purchased before that. The Harriman Ranch was purchased May 17, 1897. Immediately after the purchase of the ranch we spent thousands of dollars on it putting it in shape. It was badly run down.

Recross-examination by Mr. Nye:

7,736.10 acres of Lake Cheesman land were purchased from the Government at $1.25 per acre. 800 acres were purchased from the State of Colorado for $3360. 160 acres at $5 an acre and 640 acres at $4. per acre. Our records do not show the purchase price of the placer claims. They were purchased by Mr. Cheesman who took in his own name and later transferred them to the company. There were a number of other mining claims in the Lake Cheesman site which we did not purchase but contested successfully after extensive litigation.

Redirect examination by Mr. Dorsey:

There were 20 or 30 of these filings and claims staked out on which we had to prove abandonment or contest. We also had
267 to buy out Dr. Crane who had a homestead claim covering the dam site. In the end we were forced to contest his claim.

Witness WILLIAM T. BARNES.

Direct examination by Mr. Dorsey:

I reside in Chicago, Illinois. Am a civil engineer. I have been engaged in that work 21 years, mainly in the water works field. During the past three years considerable of my time has been devoted to the preparation of inventories of water works properties for the purpose of valuation. Received my training at the Massachusetts Institute of Technology. Became connected with the property of the D. U. W. Co. October 1913 to prepare an inventory of same. Am member of the firm of Metcalf & Eddy. In preparing inventory worked directly under supervision of Mr. Metcalf with whom I have been associated since 1894, and have assisted in many of his appraisals. In some cases in the field work and in others in the office. The inventory was an independent inventory prepared by Mr. Metcalf and his assistants, who used the engineering force of the D. U. W. Co. about six men, which we increased to about 20 who were directly under my charge but the work was supervised generally by Mr. Metcalf and Mr. Anderson. We brought to Denver for the purpose, two men, who had been engaged in similar work elsewhere. Pages 1 to 61 of the inventory contain matters of general information prepared directly under the direction of Mr. Metcalf with which I had no connection except to assemble and compile. At page 13 appears a comparison between our figures as to the distribution pipe system and the figures of the Public Utilities Engineers to show the extent to which the two inventories were in accord. The difference is practically one-third of one mile. The two inventories are substantially in accord as to all elements of the physical property. Description of tables at pages 41 to 43 giving detailed information concerning the various conduits worked up from original field books and profiles of construction and supported by photographs showing conditions under which construction work

was carried on, difficulties encountered, etc. In addition to these records Messrs. Metcalf, Anderson, myself and such assistants as were necessary made frequent inspections of the entire property to obtain such additional information as was required. At many points excavations were made to expose pipe lines to joint inspection by us and engineers of the Utilities Commission for the purpose of indicating their condition.

268 Pages 65-97 of Exhibit C. are forms prepared for summarizing the inventory and the various items of property. Class A. pertaining to lands, B to water rights, T to furniture, materials, and personal property and the other classifications to the various other items of physical structure. Pages 109-395 inclusive contain detailed statement of the value and extent of individual items involved in the structures of the plant distributed according to the operating divisions of the company. Pages 399 to 815 inclusive contain more minute detailed information of the quantities of material, fittings, etc., of the classes of property for which valuations are set forth in pages 109 to 397. Interspersed between pages 111 and 395 appear maps, drawings, reproductions of photographs, etc., to show more explicity the situation as to the works. They are accurate reproductions of drawings, maps, and photographs on file in the company's engineering department made at the time of the construction of the works.

Cross-examination by Mr. Nye:

Every effort was made to have this inventory just as accurate as it is possible to make it. Many of the matters contained in Exhibit C. are the result of detailed field work under my direction. As to other matters we had to rely upon the company records. Columns 8 and 9 of page 41 give the slope per thousand feet and per mile of the hydraulic grade lines of the conduits, taking into consideration all elements that bear on the carrying capacity of the pipe. Photographs, illustrations, maps, etc., are typical selections from the records in the company office made by Messrs. Metcalf, Anderson, and myself. Those relating to river, railway, and street railway crossings were prepared specially for exhibit C. This is also true as to plates showing population curve and bacterial and chemical charts and as to a few photographs taken by Messrs. Anderson and Metcalf. Quantities of concrete, steel reinforcing, and such material as could not be inspected were taken from the estimates of the resident engineer. Quantities of structural steel were taken from the plans from which the structure was built. As far as we could we made personal inspection of all visible structures to check them with the plans.

Redirect examination by Mr. Dorsey:

Pages 13, 37, 38, 41 and 44, 62-97, 98-100, 111 to 395, and those portions embraced in pages 429 to 495 testified to by witness Barnes offered in evidence. Pages 105 and 106 containing "General Water Works statistics" were prepared either by me or under my personal

direction from census reports and such other records as were
269 necessary and available for the preparation of such information. For the past 20 years until recently my experience has been mostly on construction work. Should say I have been personally responsible for about $3,000,000 worth of work. From my experience I am of the opinion that the records, plans, etc., upon which this inventory is based are regular, well balanced construction records.

Objection overruled. Exception. Motion to strike overruled. In addition to the inspection of the records we also inspected in every instance possible the structure itself.

Witness WILLIAM T. BARNES Recalled.

Recross-examination by Mr. Nye:

Admission by Mr. Nye of the matters covered by the printed pages of exhibit C, testified to by the witness Barnes as the testimony that he would give concerning the specific items if especially interrogated as to each item subject to the general objection that the entire matter is incompetent, immaterial and irrelevant. Particularly specific objection to data comparing with report of the Public Utilities engineers. Overruled. Cost items on the weirs at Lake Cheesman taken from notes of field engineers because construction was different from plans. Cost items as to preliminary dam expense at page 121 taken from the auditor's record of that work. I do not undertake to answer for the accuracy of records of original construction except that from my experience as an engineer they appear to be well balanced and consistent.

Information as to the quantities involved in the construction of Marston Lake was taken from original records together with such field examination as was necessary to obtain complete information. Our results were in substantial accord with the results obtained by the engineers' committee who 5 or 6 years previously made a similar inventory. Information as to the puddled trench was obtained from plans and from a conversation with C. P. Allen, member of the Board of Engineers of the Public Utilities Commission who was in charge of that work for the company.

We did not consider the fact that the Littleton Flour mill and property was the property of another corporation. Objection to inclusion of this property listed in Class J, overruled. Items of pavement over mains represent the condition now existing without regard to condition when pipe was laid. Items appearing on page
371 concerning river crossings, etc., are based upon construc-
270 tion history and a very detailed survey of each crossing by a member of my staff so that the appraiser might have the most intimate knowledge possible of each crossing.

Redirect examination by Mr. Dorsey:

Many of the structures being underground it is impossible to inventory quantities and numbers by actual count, so we had to rely upon the best information available.

Witness CLARENCE GOLDSMITH.

Direct examination by Mr. Dorsey:

I am a hydraulic engineer, received my education at the Massachusetts Institute of Technology, graduated in 1898. Reside in Boston, Mass. From 1898 to 1905 was superintendent of water works at North Andover, Mass. From 1905 to Aug. 1907 Supt. of Public Works North Andover. August 1907 to Sept. 1911 was employed by the National Board of Fire Underwriters as hydraulic engineer. Since then, except for 11 weeks have been employed by the City of Boston in charge of the design and construction of a new high pressure fire system. National Board of Fire Underwriters is representative of 125 or 130 insurance companies, foreign and domestic, doing business in the United States. My duties were to inspect water systems to determine their ability to furnish fire protection. Made some 40 such inspections in the larger cities in the country including Denver.

Inspected Denver during a period of about 3 months, in Sept. Oct. and Nov. of 1910, examining every portion of the works. Pressure and flow tests were taken on different parts of the system and valves and hydrants were operated to determine their state of repair. The D. U. W. Co. did not indicate where such tests were to be made nor assist us in the making of the tests. The inspection in Denver was made in exactly the same manner as in other cities.

The conclusion arrived at after the inspection in Denver was that the system was adequate and reliable. The following are the cities in which I have made inspections similar to that made in Denver: Altoona, Pennsylvania; Atlanta, Georgia; Binghamton, New York; Boston, Massachusetts; Brockton, Massachusetts; Buffalo, New York; Butte, Montana; Camden, New Jersey; Clarksburg, West Virginia; Colorado Springs, Colorado; Columbus, Ohio; Day-
271 ton, Ohio; Detroit, Michigan; Fall River, Massachusetts; Great Falls, Montana; Helena, Montana; Lawrence, Massachusetts; Lincoln, Nebraska; Lowell, Massachusetts; Los Angeles, California; Lynn, Massachusetts; Missoula, Montana; New Bedford, Massachusetts; Norwich, Connecticut; Omaha, Nebraska; Ogden, Utah; Portland, Maine; Partial; Philadelphia, Pennsylvania; Pittsburg, Pennsylvania; Reading, Pennsylvania; St. Joe, Missouri; San Francisco, California; Seattle, Washington; South Omaha, Nebraska; Spokane, Washington; Salt Lake City, Utah; Tacoma, Washington; Toledo, Ohio; Wilmington, North Carolina; Worcester, Massachusetts; New Haven, Connecticut; Partial; making a total of forty-one. Comparing the reliability and adequacy of the plant in Denver with the plants in the other 40 cities it is my opinion that the Denver plant is equaled by only one of the others and that it excels all except that one. At pages 13, 38 and on plate 7A in exhibit C, occur accurate reproductions of parts of my report on the Denver works made in 1910. Plate 7-*a* is a map showing the pressure and quantities of water obtained in tests in the congested value district. Plate 7-*b* is a photographic copy of a tracing made by me of the entire distribution system of the D. U. W. Co. show-

ing pressures and quantities obtained in tests over the entire system. Quantity of water available in a water supply system is vastly more important than pressure in putting out fires.

There have been many important additions to and improvements in the Denver system since the inspection in 1910. Exhibit W. is a map showing the condition of the distribution system at the time of the inspection in 1910 with the additions to the system since 1910 added in yellow coloring and with the mains owned by the City of Denver identified in green. These additions were not put on the map by me personally but I checked them from the records of the company. The additions have had the effect of strengthening the system and increasing its capacity to deliver water. Have visited and examined the system three times since my inspection in 1910, have kept in touch with it from a fire protection viewpoint.

Through the construction of the 60 inch conduit it is possible to keep Marston lake constantly full and it is of great daily advantage to have such a supply of water in such proximity to the city.

Pages 45 to 48 of Exhibit C. contain quotations from the National Board of Fire Underwriters' report except as to the pressures there stated which are taken from a map prepared by me but which does not accompany the report. Such pressure records were
272 taken at 441 points on the system. The table on page 48 indicates the result of fire flow tests taken. The reference in the report to the outlying districts where pressures are not well maintained, refer to such sections as are indicated on Exhibit A. by the names Barnum, Argo, Globeville, Montclair, and certain portions of South Denver. Generally sparsely built residence districts. The report states the use of fire engines is necessary in all sections. To date 253 cities have been inspected by the National Board. There is nothing unusual in the fact that fire engines are necessary for the extinguishment of fire in Denver. In making our inspections we ascertain that the quantities of water necessary for fire protection are available over and above the maximum demand for water for domestic purposes. We ascertained that in Denver water is available under this condition commensurate with the risks involved.

In the congested value district Denver has a distinct advantage in a doubly assured supply because of the interconnection between the Capital Hill Gravity service and the North Denver Gravity service. The report states that the carrying capacity of the supply mains entering Globeville, Berkeley, and the Capital Hill High service are insufficient to meet the demands of maximum domestic consumption. The system in Globeville belongs to the city of Denver. Berkeley is the territory in the extreme northwest portion of the city shown upon exhibit A. Part of the mains in which belong to the city of Denver. Since 1910 however, mains have been laid by the D. U. W. Co. which materially strengthen the supply available in that district. The reference to South Denver was particularly to the southerly portion of that territory. At the time of the inspection nearly the entire

distribution system belonged to the City of Denver. Since the inspection the D. U. W. Co. has laid several large mains into that district that materially increase the quantity available. The territory referred to as the Capital Hill High Service relates to the portion lying east of Colorado Blvd. but more particularly to the section designated as Montclair. The booster pumping station is located on the main leading to Montclair. The reference to poor gridiron and much 4 inch pipe in outlying sections refers particularly to the sections shown on exhibit A. as Barnum, Colfax, part of Berkeley, Globeville, part of Elyria, and part of South Denver.

The new construction since the inspection has been materially beneficial, particularly, in Berkeley and South Denver. The other areas are generally sparsely settled. I have had to do with the installation and operation of engines, boilers, and pumping machinery for 20 years, in 1893 was connected with the engineering corps of the World's Columbian Exposition of Chicago as
273 chief observer of performance of machinery including engines and boilers. In 1895 was in charge as engineer, of installing boiler plants at the Cotton States International Exposition at Atlanta, Georgia. Was chief engineer in charge of the operation and in the salvage of the plant. I held engineer's license in Georgia and have held a first class engineer's license in Massachusetts. There was a previous inspection in Denver by the National Board in 1906. The board aims to inspect cities about every four or five years, except some that are growing slowly. Recommendations contained in that report have been complied with in part but not fully. Fireproof pumping stations have not been installed. That requirement however, is no longer made by the National Board. The recommendation to adopt meters to reduce consumption has not been complied with. 4 inch pipe has not been replaced. Most of it belongs to the City. Additional valves have been installed but there are still many lengths of mains which can be advantageously subdivided.

The average length of main required to be cut out in case of repairs in the congested value district is 542 feet. In representative residential districts the average is 860 feet. The standard of perfection adopted by the National Board and with which comparison is made provides for a maximum of 500 feet in congested value districts and a maximum of 1,000 feet in residential districts. In the congested value district the Denver system is very near the required standard and in the residential districts averages better than the required standard. Recent additions to the system have been along the best engineering lines. Many have complied with the recommendations of the National Board and others, notably the new conduit, are in addition to the recommendations of the National Board. 33 fire flow tests were taken in which 158 hydrants were opened, from four to seven simultaneously in the individual tests, depending upon structural conditions and strength of system. These were independent of the 441 pressure tests made. The locations for the tests were made by me without suggestion from the water company.

I had access to the engineering data of the company. I found that the quantities required for the protection of the congested value district were available about each block in the district and the quantities required for other sections were generally available. The system of parallel mains in the congested value district is a distinct advantage. The system is adequate and reliable in all particulars and sufficient for the purposes for which it is required. The 1910 report stated that the six wood stave gravity conduits were in good condition, well installed, and not subject to damage by flood.

274 I have visited the points where two conduits were recently damaged by flood. I have investigated the cause of that damage and find that it was due to a height of water which greatly exceeded any flood on the water shed prior to this time. My opinion expressed in 1910 was based upon the fact that the high water which had occurred up to that time would not have caused that damage. It appears that the river has left its bed and created a new channel for itself. In my opinion the damage was not due to defect in design or construction. The reports of field engineers of the National Board are reviewed by a corps of office engineers for approval or disapproval before the reports are issued. I am a member of the American Society of Mechanical Engineers, the American Society of Civil Engineers and the American Institute of Electrical Engineers.

Cross-examination by Mr. Nye:

The office of the National Board of Fire Underwriters is in New York City. I did not inspect Denver in 1906. The 1910 inspection began early in September. I went to the office of the company when I arrived in Denver and met Mr. Skouland, who was instructed to give me such information as I desired. In different parts of the inspection I was accompanied by Mr. Skouland, Mr. Thomas or Mr. Sweeney. I visited the main pumping stations and other parts of the system unaccompanied by anybody. The hydrant tests were laid out by me and run under my direction. I had four men in my own party and as nine men were necessary for the work the remaining five were borrowed from the Rocky Mountain Inspection Bureau. Mr. Skouland and Mr. Sweeney were present at these tests representing the company. These tests were independent of the pressure tests, totaling 441 over the entire system. The pressure tests were made from 1,200 to 1,500 feet apart over the entire system from the highest to the lowest points in order to determine the maximum and minimum pressure as well as the average. I determined at the time of the inspection that the six conduits were adequate to furnish the required supply to the city. The capacity of the 30 inch line was calculated as 8,000,000 gallons, the 34 inch line, 13,000,000 gallons, the 40 inch line 23,000,000 gallons, the 48 inch line, 25,000,000 gallons, the Cherry Creek line 5,000,000 gallons, the Mississippi Street line 14,000,000 gallons. That makes a total of 88,000,000 gallons.

The capacity of the two lines affected by the flood damage was 22,000,000 gallons, reducing the total supply capacity to 66,000,-

000 gallons. The serious condition caused by the diminution of supply was due to the fact that the maximum rate of con-
275 sumption has increased since 1910 and that the 40 inch line which lies in close proximity to the river was not being operated to maximum capacity for fear of damage to it. With the conduits out of service sufficient water is being furnished the city to meet any usual demand. It seemed to me in 1910 that ample precaution was taken against any damage that could occur. In fact, I stated in the report "The structural features of the supply works are well designed, permanently built and extraordinary precautions have been taken to avoid interruption in the supply by the installation of six conduit lines, well constructed and of ample capacity." If such an enormous consumption of water as is developed by Denver is necessary the accident has proved that the lines are not adequate with two out of service to furnish these large amounts. But these large amounts are considered wholly unnecessary. The consumption in Denver, however, has not been regulated by the installation of meters. If the consumption had been reduced according to the recommendations of the National Board the plant would have been able to deliver sufficient water with two conduits out.

I do not know that the Ashland Avenue Pumping Station was partly out of commission. The pumps were in operation when I was there Sunday afternoon at 5 o'clock. Salt Lake, Spokane, Ogden, Missoula, Helena, and Colorado Springs, of the cities that I have inspected use water for irrigation like Denver, none of them are metered. Investigation to determine the effect of the irrigation draft on the Denver System was made indirectly in 1910 by examination of pressure records for the previous year, though the use of water for irrigation had practically ceased at the time of the inspection. I took into consideration the effect upon the system of this greater draft in making my report. In connection with pressures taken at the time of the inspection at the 400 and odd points and the quantities discharged at the fire flow tests it is perfectly easy from the consideration I gave the matter to determine the effect that that consumption would have. I believe that the examination that I made for the purpose of this determination was sufficient. I have heard and known of failures of water supply in other cities similar to the failure that occurred in Denver due to these breaks. Altoona, Pa., Clarksburg, W. Va., Dayton, Ohio, Lawrance, Mass., Norwich, Conn., Omaha, Neb., Philadelphia, Pa., San Francisco, Cal., Seattle, Wash., Worcester, Mass., that is all that I can recall at the present time. Five of those were due to breaks or unforeseen accident and four to lack of supply. One was the flood in Dayton, another the earthquake in San Francisco. The precautions
276 taken in Denver were much better to avert accident than it has been my fortune to observe on other inspections. That these precautions were taken did not indicate any extraordinary necessity therefor. If they had not been taken, we would have recommended them. They were simply in accord with the general policy in the operation of the works, doing everything in as good

a manner as possible. The breaks occurred because the water rose over the pipes. I could not state whether the rise in the river was such as would have made it possible to have prevented the damage by protective construction.

It would have been good judgment to have taken preventive measures if one had known of the rise in time to prevent it. I cannot say whether those measures could have been taken without knowing how fast the river came up. (Objections to all preventive measure testimony overruled. Exceptions.) It is my opinion that the water pressure over the Mississippi Street line caused the break. The staves were in very good condition considering their age. I would not express an opinion as to the cause of the break near Platte Canon. It is my opinion that the break on the Mississippi Street line was not due to age. It is possible that the water came up so rapidly that it was adsolutely impossible to take precautions before the damage was done. I know nothing of the river stages except the maximum stage when it got over the pipe. (Objection to further interrogation on this line sustained.) I examined bands taken from the break they appeared to be in good state of preservation. It would not be my judgment that they should have been renewed, though I would not use them over again. Eliminating the question of the breaks the West Denver Station is not vital to the system in normal operation. The higher pressure figure and the lower pressure figure occurring beside hydrants on Plate 7-a show the pressures on the hydrant prior to opening and during the time they were open while the test was being taken. In making these tests we do not open as many hydrants as would be opened by the fire department in drawing a similar quantity of water, so a greater velocity is produced in the mains within the group than would be produced in the ordinary operation of the fire department delivering those quantities.

Check, pressure tests on hydrants attached to the main arteries feeding the group show a less drop in pressure than hydrants attached to the distributing mains within the group. Hydrants showing the lower pressures being on smaller mains. There are not enough hydrants in the congested value district. About 180 additional hydrants should be installed on the mains paralleling those to which the present hydrants are attached. The system has been
277 improved in other ways than by the installation of distribution pipes. The Pump Station in University Park has been enlarged increasing the supply of water there. The construction of the 48 inch line from Platte Canon to Marston Lake increases the quantity of water available to the city in case of fire by allowing an increased head on the mains through by-passing the filter plant, so that in emergency a large quantity of unfiltered water is available in the event of conflagration.

It also increases the supply of filtered water through permitting the constant operation of the Marston Lake filters up to capacity, which could not be done during a cycle of dry years while they were dependent entirely upon Bear creek and Turkey creek. Our reports purport to state the facts and necessarily in their presenta-

tion much more weight is given to matters of criticism than to matters of merit. Matters of merit are already satisfactory and the purpose is to get deficiencies corrected. We emphasize the things we criti-ze.

I have no recollection of what the connections recommended in the report of 1906 were that I stated in the report of 1910 had not been made.

In 1910 there still remained many lengths of mains which could be advantageously subdivided by valves. Up to 1910 no employes were detailed to attend fires, thus disregarding recommendation No. 15 of 1906. The number of hydrants is still insufficient. Some 180 hydrants are needed in the congested value district. Recommendation No. 19, for regular and frequent inspection of hydrants has been complied with. No. 18, for a change in hydrant threads has not been complied with but that would have to be done in conjunction with a change of hose thread by the fire department. That is not so important in Denver as in cities located close together where aid may be exchanged in case of fire. The system of reducing pressures below the pump station at Capitol Hill was giving satisfactory service within that district in 1910. The minimum pressure in the whole gravity district in 1910 was 16 pounds. In a number of instances in the fire flow tests it was impossible to find hydrants properly located to enable us to take pressures on the arteries feeding the groups. One test showed 7 pounds, another 6 pounds, another 9 pounds, another 3 pounds, another 5 pounds, and another 2 pounds, remaining on the mains with the hydrants discharging the quantity of water obtained. The reference to 4 inch mains or long 6 inch mains unsupported failing to give sufficient water supply refers to mains in the outlying districts, which have not yet developed sufficiently to warrant the laying of large feeder mains. Of the 2719 hydrants when owned by the water company, each generally had one 4½ inch connection for
278 fire engines and two 2½ inch connections for either hose or fire engine.

Redirect examination by Mr. Dorsey:

Extracts from report of 1910 of the National Board of Fire Underwriters contained in Exhibit C. at pages 11, 13, 38, 41, 45-48, and Plates 7-a and 7-b admitted in evidence over objection by defendants. (Objection sustained as to statement from said report at page 50, as follows: "The water sheds are ample in capacity and have been developed in advance of the growth of the city, over two years supply at the present rate of consumption being now held in storage." On the ground that witness had not shown himself qualified). In the course of such inspections particular attention is given to the source of supply and its development. In Denver I had access to all records of stream flow and rainfall which were then available for the entire watershed. I also visited the water sheds at Cheesman Reservoir, Marston Lake, the intake works on Bear Creek, on the Platte River and made computations from the records on Cherry

Creek. Have made similar examinations as to most of the other cities that I have inspected, also of the Massachusetts Metropolitan Water Supply. Many of the cities I have examined are in arid or semi-arid regions.

Recross-examination by Mr. Nye:

I should say that I went up Bear Creek about a mile above the intake or about 9 or 9½ miles above Marston Lake, and did not go up Turkey creek. I did not go up the North fork of the Platte. I did not go up the South fork of the Platte between the junction and Cheeseman Dam. But I observed such of the water shed of Lake Cheesman as could be seen from the surrounding mountains and the water shed in South Park in the neighborhood of the Antero Reservoir a good many miles above Lake Cheesman. I gave more weight to the stream flow records which in Denver are exceptionally complete, than to the observations that I made. I did not take into consideration the question of water rights. I observed as much of the water shed of Cherry Creek as could be observed from the Colorado & Southern railroad running out of the city along the creek. (Ruling on admission of statement changed and page 50 admitted. Defense excepts to first sentence.)

Redirect examination by Mr. Dorsey:

(Page 49 of Exhibit C, excluded by agreement of counsel.) I do not recollect how far out Cherry Creek I went. At the time of the inspection of 1910 Lake Cheesman was practically full.

In the inspection in 1910 I had recourse to the United States topographical maps of the territory. I was in error when
279 I stated on cross-examination that I had not gone up the North fork of the Platte. I did go there going to Lake Cheesman.

The Hazen and Williams Formula used by me in computing the capacity of the conduit lines is a generally accepted formula much used by engineers. The pressure tests made on the system independently of the fire flow tests were made without the presence of any representative of the water company. The work was done by an assistant who was driven about town in a buggy by an employe of the water company. The aggregate total capacity of the conduits left in service after the break was 66,000,000 gallons. The conduit furnishing the supply for the West Denver Station inquired about on cross-examination as a supplemental supply is one of the conduits out of service, therefore that supply is not available. In determining the sufficiency of a system for fire protection purposes we take into consideration the maximum day's consumption because the capacity of the system must be in excess of this maximum rate. A fire may occur on that day.

In as much as the accident to these conduits was an unforeseen act of nature which can be guarded against in the future by suitable construction at small cost, the occurrence has not changed my opinion as to the reliability and capability of the plant for the pur-

poses to which it is put. It is impossible to so design a waterworks system that it cannot be put out of commission. The works in Denver allow a safe margin. It is possible that all of the conduits would go out at once but not at all probable. The probability is much more remote than if they were fewer in number. I know of no city in the country in which it is not possible for the whole water supply to be taken away through a possible combination of circumstances. (Objection overruled. Exception.) Accidents to large cast iron mains in Boston have caused more serious reduction in the supply over large areas than was caused in Denver. The interruption in Dayton was caused by high water in the Miami River. The precautions which had been taken to prevent damage from that cause were insufficient. In the case of San Francisco the damage was due to the earthquake. San Francisco has been subject to earthquakes ever since there has been a San Francisco. It would be my opinion that a flood in the Miami River would be just as much to be anticipated as a flood in the Platte. And I should say that an earthquake in San Francisco was more to be expected than a flood in the Platte. Substantial dikes that will prevent a recurrence of the flood damage in Denver can easily be provided.

I stated that the West Denver Station supply was not vital on the theory that it might be out of service temporarily and
280 still leave sufficient supply for the city. But it is operating as a part of the system and if it were not there we would not consider the works satisfactory as there would not be sufficient reserve provided. The West Denver station should be continued as part of the system and operated as it was in 1910. All hydrants in the congested value district furnished a satisfactory supply of water notwithstanding the fact that some of them are connected to the smaller main in the street where two mains exist.

Redirect examination by Mr. Dorsey:

In referring to that portion of the Capitol Hill high service where the pressure is reduced, below the pumps, I meant that portion of the service lying west of the pump station, below the elevation of the pumps and independent of the main gravity service. The 30 pounds is immediately below the reducing valve and as the elevation reduces the pressure increases. The minimum pressure of 16 pounds mentioned was the lowest pressure observed anywhere on the main gravity service. The pressures indicated in columns X and Y in the fire flow tables were both taken while the hydrants in the particular group were open and flowing. In selecting the locations for the tests particular attention was paid to pick out the weak points in the system. Other tests were run at the strong points to determine the capacity of the arterial feeders. The drop in pressure in test No. 9 was due to the fact that there was no large main feeding that group. The same is true in test No. 12. In test No. 13 the difficulty was caused by the gridiron being formed principally of 4 and 6 inch pipe. Test No. 16 the difficulty was caused by the inability of a single 6 inch main to supply the quantities desired. The same is

true of test No. 22. Test No. 23 the difficulty was caused by the 4 inch pipe in Globeville where the pipe system is owned by the City. Test No. 25 the difficulty was due to the hydrants being located on 6 inch mains extended from 6½ to 8½ blocks without support. In test No. 9 the pressure with the hydrants closed was 85 pounds. In No. 12, 63 pounds. In No. 13, 71 pounds. No. 16, 90 pounds. No. 22, 42 pounds. No. 23, 85 pounds. No. 25, 62 pounds. These particular locations were picked as the weak spots on the system, though the pressures were generally higher than the average. If the tests had been made a short distance from the locations selected in each case a greatly increased quantity of water could have been obtained.

In the congested value district direct hydrant hose streams can be used up to and including the 4th story of a building. At the time of the report about 75 per cent of all the buildings in the dis-
281 trict were 3 story. Even when the maximum quantity of water was being drawn sufficient pressure remained on the system to cope with fires in three story buildings and put out fires spreading from flying embers. The pressures in Denver are better maintained under heavy draft through the whole system than is the case in the other cities which I have inspected.

Recross-examination by Mr. Nye:

No material benefit would be derived from opening the valves from the Capitol Hill High Service to the gravity service, the greater pressure from the high service would quickly be dissipated in the gravity mains. The pressure in the congested value district could be increased in case of fire by opening the valve connecting with the North Denver gravity service, or by speeding up the pumps at West Denver. It is essential to maintain the pumping capacity of 18,000,000 gallons at West Denver to utilize 12,000,000 gallons of water per day. My statement that hose streams could be used up to four story buildings in the congested value district is based upon actual experience and experiment with hose streams under varying pressures. I attended only two fires while in Denver and made no tests at either. I never heard of a fire in Denver where the stream supplied by a fire engine failed to reach the second story. If that did occur I would want to know the hydrant to which the engine was attached and the condition of the engine before expressing an opinion. There are many conditions that enter into the use of water by a fire department.

Though better conditions could have been obtained in the fire flow test immediately adjacent to the tests enumerated as not satisfactory, there was a deficiency at the point where these tests actually were made. Reducing valves reduce the pressure without materially affecting the flow of water. We determined the effect of the valves in Denver by the tests. The tests were taken under normal conditions because the pressures at the time of the tests corresponded with the pressures previously taken on the system. If there were opportunity and time men and material enough at hand the flood

damage probably could have been prevented by a temporary dike of sand bags. I don't know what conditions prevailed prior to the damage.

The flood at Dayton and the earthquake at San Francisco were certainly more serious than any that had been previously experienced in either place. I have not changed my opinion as to the sufficiency of the capacities, cross connections, etc., of the 6 conduit lines as expressed in 1910.

Redirect examination by Mr. Dorsey:

I have made numerous investigations on specific hydrants and in specific localities where shortages of water for fire purposes
282 have occurred, to determine their cause. The results obtained and the opinions formed are based upon well settled hydraulic principles that apply equally as well in Denver as elsewhere. The amounts of water required under the standards of the National Board are the maximum amounts that could be required under any circumstances. Such amounts are not required at every fire. I am not informed as to the efforts that were made to protect these conduits against the flood damage. I observed that a dike had been constructed near the failure of the Mississippi Street conduit.

There had been frequent floods at Dayton before the flood that put the works out of commission and there had been previous earthquakes at San Francisco. The recent flood in the Platte river was unusual from the fact that no such stream flow has ever been recorded previous to this flood. I will forward from Boston a copy of the National Board report on Denver for 1910.

Witness JOHN R. FREEMAN.

Direct examination by Mr. Dorsey:

I reside at Providence, R. I. Am a civil engineer making a specialty of hydraulic work, municipal water supply and water power. I obtained my technical training at the Massachusetts Institute of Technology. Am 59 years old. (Qualifications.) (Principal activities: Engineer member of Metropolitan Water Board Massachusetts. Board of Water supply of New York City. City of San Francisco. Baltimore. City of Mexico. Hartford. California Gas and Electric Company. United States Reclamation Service. Mexican Northern Power Company. Great Northern Power Company. The Canadian Government. Mississippi River Power Company. City of Los Angeles. Aggregate cost of works more than $200,000,000. Am familiar with structural costs, values, and depreciations in respect to water works property, and with the financial management of public utilities. Was a member of the board of appraisers appointed in 1907 to appraise the property of the D. U. W. Co.

Was a member of two different boards of engineers in connection with the construction of the Panama Canal. The first to devise foundations of the locks and the Gatun Dam, the second to report on the relative merits of the sea level and lock canals. Those boards were appointed by the President of the United States. Mr. Stearns

who represented the City of Denver on the Board of Appraisers was a member of both of those commissions and Mr. Harrison who with me represented the company in the appraisal was a member
283 of the second board. We were appointed on the Board of Appraisal sometime in October of 1907. Came to Denver early in November, remained here nearly the entire month when some of us were called back to New York, returning to Denver again in about a week and remained nearly through the month of December. Most of our deliberations were carried on in New York because of the illness of Mr. Harrison who was suffering from heart trouble. Mr. Harrison was formerly chief engineer of the D. U. W. Co. and had charge of the design and construction of Cheesman Dam. He was later assistant chief engineer for the Pennsylvania R. R. Co. on the construction of the tunnels under the East River and later deputy chief engineer of the Board of Water Supply of New York City.

Prior to his connection with the D. U. W. Co. he was assistant chief engineer of the Isthmian Canal Commission and assistant chief engineer of the Deep Water Ways commission investigating canal routes from the Great Lakes to the Ocean. Prior to that was in charge of construction of storage re-servoirs for the control of the head waters of the Mississippi River and resident engineer on the Chicago Drainage Canal. He was an exceptionally able engineer of the highest character and standing. Copy of the Report of The Board of Appraisers and Arbitrators on the value of the works of the D. U. W. Co. attached to the bill of complaint appears to be an accurate copy of our report submitted March 20, 1909, on which we began investigation November 1907.

We made a most thorough investigation of all details, a careful inspection of all visible parts of the plant, were furnished with complete plans of the works, had special plans prepared to show some parts more fully, took a great deal of evidence on the question of water rights, value of lands, real estate, etc. Both parties were represented by Counsel. In every way we sought to become as fully informed as possible on all matters bearing upon the case. It is my judgment that the efforts made put us fully in possession of all facts necessary to form a fair judgment of the value of the property. The value found was $14,400,000., as of December 31, 1907 or January 1, 1908.

I have examined Exhibit C. and am convinced that it is an inventory of the property valued by us with additions made since that valuation. The valuation of $14,400,000 was divided into three parts. Physical property, $10,354,075. Water rights, $2,845,925. Business and going concern, $1,200,000. $100,000 of this amount was for the value of company business during the remainder of its franchise period and $1,100,000 for going concern value entirely independent of any business and franchise value.

284 In addition to valuing the property of the D. U. W. Co. we valued certain property owned by the City of Denver, chiefly composed of the water system in South Denver. A list of water rights contained in the report of the board was furnished by Mr.

Miller Secretary of the D. U. W. Co. From page 11 to page 16 of report appears a list of city real estate valued by Victor R. Olmstead representing the city and William W. Watson representing the company. These valuations were adopted by the board of appraisers.

At pages 17 to 24 of the report appears a list of real estate outside of the city valued by J. B. McNeil representing the city and Burton D. Sanborn representing the company. Their valuations were used as a basis for determining the value of the lands for water works purposes. At pages 25-28 of the report appears a table agreed to by J. B. Hunter City engineer and W. F. Hawes representing the D. U. W. Co. setting forth the lengths of mains, number of valves, hydrants, etc., composing the system. At page 29 occurs a table agreed to by said Hunter and Hawes giving similar information concerning the works owned by the city. On page 31 begins a report on the value of personal property, furniture, tools, etc. owned by the company, agreed to by C. F. Read representing the city and A. E. Hamilton representing the company. Their values were adopted by the board.

At page 34 begins an inventory of the material at the West Denver Pipe Yards, agreed to by Mr. C. L. Harrison, member of the board representing the D. U. W. Co. and Mr. Stearns, representing the city. At page 45 appears a schedule embracing all other physical property valued by the board. The $100,000 valuation for business value related to the possible earning capacity of the plant for the two year unexpired period of the franchise. Otherwise the board gave no consideration of the earning power of the plant in arriving at its valuation. In general reproduction cost less depreciation was the basis of valuation.

I am not clear as to where the line is drawn between the properties of the D. U. W. Co. and the S. P. C. & R. Co. but we valued the property of the two companies as a unit system, without regard to division. Exhibit X is a diagrammatic sketch on a distorted scale showing the location of the six supply conduits which bring water to the city. Exhibit Y. is a diagram-atic sketch of the elevations of the different reservoirs and the elevation of the sources of supply and filtration works, also the relative elevations of the different supply conduits.

"General description of the system, handling and method of operation of the same." Cheesman Dam is one of the very finest masonry dams in the world. I know of no other dam that
285 is its equal in water-tightness. From the view point of desirability and economy of construction the site is the best I have ever seen anywhere in the world with one possible exception, in California. I know of no other reservoir used for domestic water supply that is so desirable. The construction of the new conduit to supply Marston Lake has greatly increased its utility. It is a very desirable and very valuable part of the works of the company. The connection with the Platte River through the new conduit, has greatly increased its value and also increased the value of the water rights of the company through permitting them to be used more efficiently, and through permitting more effective conservation

of the water supply. We gave very careful consideration to the distribution system. I consider the duplication of mains in the congested value district of distinct advantage and value to the system. Though the valuation allowed for those duplicate mains was less than 1-50th of the valuation allowed for the entire distribution system.

A further value of Marston Lake arises from its elevation which is greater than any point served in the city and from its convenient location which will permit of the construction of future filtration plants there at less distance from the city than any of the existing plants. There are certain difficulties connected with the water supply in Denver that usually are not presented all together in other cities. The difference in elevation requiring the division of the system into high and low services, the uncommonly large quantity of water demanded by the consumers and the fact that the city is located in a land of very little rain and great variation in stream flow which shrinks to insignificance during the latter part of the summer and fall and necessitates carrying a much larger quantity of water in storage than is usual in cities that are required to provide storage reservoirs by reason of taking of their supply from streams of varying flow. The population of Denver is also badly scattered, greatly increasing the expense of the distribution system. The population and number of taps per mile of pipe in Denver being relatively small and the cost of the distribution system per capita relatively large.

The reserve storage provided in Denver is greater than in any other city in the country with the possible exception of San Francisco, but it is not excessive. The D. U. W. Co. has not made provision for growth and extension too far in advance of its present condition. The use of 6 supply conduits is a good feature of the works and tends to make them more safe against interruption of the supply. The wood stave construction is entirely proper. There are some relatively small articles of no great value which are not indispensable in the operation of the system but substantially everything
that I have seen in the structures, supply yards or inventory
286 are proper and useful in a water supply plant. The Board of Appraisers valued the lands and structures at Lake Cheesman at $1,955,000, lands and structures at Marston Lake, $673,805. The distribution system at $3,850,165. The personal property including furniture, fixtures, and material on hand at $328,053. Probably more time was devoted by the Board of Appraisers to a discussion of the value of the water rights than to anything else connected with the system. Mr. Stearns did not agree to the valuation for water rights finally found by the board. In the final value no definite sum was fixed for the several rights, they were considered more valuable assembled as a whole than as divided parts.

I have not considered whether the water rights are more valuable today than at the time of the appraisal but my personal judgment at the time of the appraisal was for a slightly greater value than was finally agreed upon. There were certain properties of the company, principally ranch land, acquired in connection with water

rights that were held in reserve against future need for the utilization of such rights until they should all be needed for the benefit of the city. This is also true of the water rights of the Littleton grist mill, control of which gave the company more efficient control over the priorities of the Platte Canon Ditch. We allowed a very small value for the so-called Strong Reservoir site. It was my understanding that it was acquired before Lake Cheesman to serve a purpose somewhat similar to the purpose for which Marston Lake is now used.

In the future it may become useful in connection with future water rights from Lake Cheesman. It is a very good reservoir site and can be given great capacity at a relatively small expense. We allowed a very small value for Sullivan Reservoir, much less than reproduction cost. It is well suited for supplying the eastern portion of the city by gravity when it is needed in connection with the growth in the Capitol Hill district. I do not believe that the water company has gone beyond the proper practice in acquiring and holding such property against future need. Going concern value is the added value attached to a live system over a dead system. It has no reference to the element of franchise or good will. The going value of this plant is as great today as when we appraised it. To bring the 1907 valuation down to date it would be necessary to add additions since that time, deduct the value of the parts separated from the property and deduct depreciation that has occurred on the property previously appraised and since added. I have obtained from the company a statement of the additions since the appraisal and subtractions from the plant. To check the details of the extensions, I have had the chief engineer prepare a map of the
287 system which I might compare with the map prepared for us six and one-half years ago.

From that and from inspection of the visible property I have concluded that the amounts charged for those additions, are proper and reasonable charges. The detail of these charges is shown by Exhibit Z. In addition to the expenditures shown by Exhibit Z. I have added 17½ per cent for overhead charges and interest during construction which I consider a very moderate allowance for work done piecemeal and scattered over a number of years. I was informed that the only separation from the property which we had appraised was real estate which had been sold for $39,777.90. I found the total cost for net additions to the plant amounted to $1,970,892.74. In addition to my judgment that the charges for these additions are reasonable, I am supported by an estimate made by our board that expenditures to the amount of about two million dollars would be necessary to keep the plant up to the demands of the city during the period involved.

Taking into consideration all of the elements necessary to be considered it is my opinion that the value of the plant based upon the 1907 appraisal brought down to date is $15,370,000. I have not attempted to put a money value on the increase in the value of water rights. Though I am of the opinion that they have increased in value and that an increase has been effected by the connection between the Platte river sources and Marston Lake.

I think the method adopted is equivalent to the reproduction cost less depreciation method, the costs involved being so recent as to be the most convenient measure of such cost. I have given very careful consideration to the question of depreciation on these works. The board of appraisal sought to find for every important element of these structures the remaining useful life. We found after such examination that it would be necessary, to make good, the then value of the physical structures to put aside the sum of $134,000 a year. This amounted to 1.625 per cent on the value of the then existing plant on which interest must be earned at the rate of 5 per cent per annum compounded to make good the structures upon the expiration of the estimated useful life. That depreciation allowance is independent of the charges for ordinary maintenance, repairs, and renewals. I estimate that a fair allowance for depreciation of the present plant is $168,112. This annual depreciation is the amount by which the property devoted to public use will each year be lessened in value by its dedication to that use. This depreciation allowance is for the normal depreciation and does not take
288 into consideration the abnormal depreciation that will result if the city constructs a competing system, within the next seven years. To make good that abnormal depreciation it would be necessary to more than double the existing leaflet rates. (Objection to this line of question overruled. Exception.)

In ascertaining the accrued depreciation at the time of the previous valuation we depended upon the average judgment of the board. We were able to see the structures and see what had occurred so there was no necessity for adopting a method like the sinking fund method. In estimating the future depreciation we employed the so called sinking fund method, which in my judgment is the most proper and approved method for estimating future depreciation. If we had adopted the straight line method the annual charge for the next five or seven years would have been much higher than estimated by me. In computing the depreciation accrued since the appraisal I arrived at the sum of $900,000, which I deducted from the amount of the appraisal plus additions. I believe that the sum of $350,000 a year would be a fair allowance for the ordinary operation and maintenance expenses exclusive of taxes, and depreciation on this plant for the next four or five years.

The fact that the number of miles of pipe required in Denver to reach a given number of consumers is exceptionally large and that the per capita consumption of water is very large would necessitate a higher schedule of rates than would be necessary in the average city.

Cross-examination by Mr. Nye:

I have devoted to a study of this situation not less than 100 days in 1907, 1908, 1909 and from 15 to 20 days during the present year. I reached the conclusion concerning which I have testified, last week, though I may have made a few computations this week which I took into consideration in my testimony. It is difficult to say absolutely what portion of my work in preparation for this case consisted of original inquiry and what part applied to connecting up with the

previous valuation. I reviewed the data collected by the board of appraisal entirely independent of the conclusions reached by that board. I would say that I have reached a new determination, having under consideration the old determination, but which in a sense is independent of the determination of that board. The two inquiries have been so closely interrelated, having both the old and new data in hand, that I would not attempt to say what portion of my consideration had been devoted to each class. The new data consisted of various facts contained in exhibit C. and the report prepared
289 in part by Mr. Fellows. Prices were not extended in the particular copy of Exhibit C. that I had but I have seen some values that have been extended by the parties who prepared that inventory. I am connected with several companies that have money to invest. Some of these investments are in corporations operating under franchises, I do not now recollect of any investment in securities that run for a longer time than the franchise. In general my determination of the value of the physical plant took into consideration the same elements that were considered by the board of appraisal.

The board of appraisal considered original cost as one element, other elements were increase in the cost of labor since original construction, the difference in cost of cast iron pipe, and in fact, took into consideration every element that we could reach. The cost of reproduction was what we endeavored to reach. In some cases as the starting point toward that we took original cost. In the recent determination I have tried to follow the same methods.

I will endeavor to supply you with such original cost data as I have in my possession. It is very fragmentary in form and incomplete, however, and merely in the form of memoranda. I did not state that I had recently made an entirely independent and complete estimate and determination. I relied in part on the previous determination. I cannot recall that we ever had before us the price paid by the D. U. W. Co. for the property acquired in 1894. In some cases we called for vouchers on original cost and were furnished with whatever information we requested. The allowances for interest during construction, engineering, contingencies and general expenses, were our estimates of what those items would cost to reproduce this plant based on the costs that I have found by experience are actually incurred. In arriving at my recent determination I did not attempt to go through exhibit C. and value the items separately. Our board had similar lists before it. In some instances in the previous valuation I estimated the values in detail, in other instances I took certain structures, buildings for example and estimated the value by applying unit cost to the area or contents.

The figures that I arrived at were frequently not the figures determined on by the board. We arrived at our conclusions after more or less debate on many items. In my recent determination I reached the same figure for the value of the property as of January 1, 1908, as was reached by the board of appraisers less $100,000. That being the allowance for business value, which I deducted. I

used the same classifications as were used by the board of appraisal.

290 We accepted the valuation placed upon the land outside of the city by McNeil and Sanborn as a basis showing the agricultural value of the land but not as purporting to show the value for water supply purposes. The board did not always agree on various items. One member would be high on one thing and another low on another so that the result on the total was easily harmonized though agreement was impossible on individual items. The element of connection with a domestic water supply entered largely into the final determination of the value of lands outside of the city. No agreement was reached on any final schedule into which the main items, A, B, and C, making up our total valuation could be subdivided. Sometime before his death, Mr. Harrison turned over to an official of the water company a statement containing his personal notes and conclusions on various items of the property. This was done without my knowledge and I never submitted any figures for it.

I have a copy of it in my case of papers but I do not recall having turned to it while testifying. I made notes on it in connection with my recent determination. (Argument by counsel over the right of Mr. Nye to examine pamphlet in Mr. Freeman's possession. Master withholds ruling to examine record to ascertain whether witness referred to pamphlet.) I will produce copies of such figures as I may have relating to original cost of parts of the plant.

Mr. Nye reads from pages 741-742 figures purporting to be figures read by Mr. Freeman from the pamphlet under discussion.

Examination by Mr. Dorsey:

I did not refer to such a pamphlet while being examined concerning the appraisal by McNeil & Sanborn to which Mr. Nye's request of this morning was addressed. When examined concerning those matters I was referring to the pamphlet already in the case which is now before Mr. Nye.

Master rules that Mr .Nye may interrogate concerning any particular page or pages referred to by the witness in giving his testimony.

Cross-examination by Mr. Nye:

Referring to the data from which I gave the figures $1,955,000 as the value of Lake Cheesman I have it here in two places, one in a memorandum by M. L. Holman of the board of appraisers and another in the copy of Mr. Harrison's notes. I may have referred to either of these sometimes one and sometimes the other.

291 From my other notes I checked off on these certain figures in order to bring them into more compact form as a matter of convenience. (Shows markings to the Master.) The Holman memorandum was more convenient to refer to because the figures are right side up as I hold the book. The others are printed at

right angles to that direction and not so easy of reference. In regard to the value of material in the material yard I referred to some ink notes written on the copy of the Harrison notes, because at that point the Harrison notes were incorrectly printed, and I used notes of my own. When I testified concerning the amount of $10,354,075 I think I referred to the brown pamphlet entitled "Report of the Board of Appraisers and Arbitrators" and not at all to the so called Harrison pamphlet. In referring to the item of $328,053 of personal property I have no doubt that I referred to the Holman memorandum, because it is more easily legible in that than in the Harrison memorandum. It is not true that I arrived at a valuation of $14,400,000 for the entire plant then deducted from that the valuation of the physical property and going-concern value to find the water right value. My conclusion was that the property was worth a somewhat larger sum than $14,400,000 but after a great deal of debate I agreed to sign the report on that total.

I don't remember exactly how the final figure was reached, except that we were several days figuring and arguing and finally got together on that figure and the other figures too. I distinctly differed in many of the items with the Harrison memorandum, but I used the total figure of the original appraisal in my conclusion. I made no deduction for the amount $12,000 allowed by the board of appraisers for the unexpired term of the lease on the company's office.

This item was contained in the valuation of city property by Olmstead and Watson and I did not attempt any revaluation of it. The only item that I eliminated was the $100,000 for business value. We did not use ten per cent of the value of the physical property as the going concern value, though it checked out about 10 per cent. My own valuation for going concern was considerable higher than 10 per cent. I think that going concern value applies with equal effect to a practical monopoly, like the water company, as to any other business. The board of appraisers was considering value for both purchase and rate making purposes.

The fact that the franchise was to expire in 1910 had no bearing on the allowance for going concern value. I think we figured interest at 4 per cent for the average period, though I have a note here June 7, 1908 figured at six per cent and have other notes of different rates. Each member of the board had different figures for
292 interest during construction. I find that my notes fixed a total of $893,000 as a proper allowance for interest during construction on the reproduction cost of the plant. I find allowances in my old notes of 15% for engineering, contingnecies and general expenses on various items. In my present allowance I figured 15 per cent, for engineering, contingencies, and general expense and added 2½ per cent as the equivalent of interest during construction. This percentage was applied to the original cost of material and labor since the appraisal. In estimating the future depreciation at the time of the appraisal I wanted to provide for $150,000 per year but finally agreed upon $134,062.

(Statement of remaining useful life of certain items of the property.)

In making the appraisal we did not determine the useful life of the various items from the date of construction but determined the remaining useful life from the date of the appraisal. Some of the structures on which we then considered the depreciation have since been entirely replaced by new structures. I took that into consideration in adopting the allowance of $900,000 as the accrued depreciation since the former appraisal.

In estimating the remaining useful life of the various useful items of property we had before us the actual years of use in every case on which to predicate average judgment as to the remaining life. We estimated at that time 8 years of useful life for the Willard Filters. I do not believe that new filters could be constructed at less original cost than those filters and operated at half the cost. In fact, I have been surprised at the low cost of operation on those filters. My judgment now is that those filters were worth more than we allowed for them in 1908, because of the discovery of the hypochlorite process. There is a discrepancy between the reservoir capacities given on exhibits X & Y, probably due to the fact that the reservoirs are operated at different levels than formerly. It is not true that Cheesman Dam is designed and constructed more heavily than is necessary for the purpose. Were I designing it today I would use substantially the same dimensions.

I think the city of Denver could be supplied from these sources without the use of Lehow Lake, but I think it is worth the small value that we allowed for it. Considering the many elements in the plant entirely independent of everything else, there are a number that are not essential in the strictest meaning of that word but if you lop off first one thing and then another the condition is very different. If Denver has stopped growing then the lopping off process might be carried farther than if it is still growing, be-
293 fore you reach the point where a particular element could not be dispensed with. If the City grows out beyond the Mississippi Street galleries they may go out of commission from that cause. The Sullivan Reservoir is not essential but it has a potential value equal to the amount that we allowed, which is the amount that I allowed in my present determination. The new construction to Marston Lake increases the value of the plant as a whole through permitting more of the Platte River water to be utilized.

The question of going concern value is a matter of judgment rather than a matter of precise computation. I consider that the allowance made by the board was fair and I consider it fair at the present time. That it approximated 10 per cent tallied in a general way with my past experience. The original valuation was for rate making purposes as well as purchase. The depreciation table that I have contains simply the assumed remaining years of useful life of the property with the valuation that we found for it at the time. It does not state the expired life or the gross reproduction cost. I have the original cost in some cases, in many cases no. In making the determination of value I did not take into consideration the

stocks and bonds of the D. U. W. Co. I do not think I knew what the stock and bonds were until sometime after we had made this computation. I do not know that the valuation found was approximately the market value of stocks and bonds. I have not the figures of gross reproduction cost here.

In many of these matters we examined the property and exercised our judgment as to what it was worth at that time. The ultimate conclusions as to present value are the only figures I have. The figures contained in the Holman memorandum are practically the figures used by the board of appraisers in fixing the final value. The board of appraisers took into consideration the item of pavement over mains. I have the figures for pavements I used myself but not the figures used by the board. I am not sure that we came to a separate agreement as to the amount to be allowed for pavement. In my present determination I considered it and concluded that the amount if different at all would be larger than it was at that time, so I did not go back into the detail. We had a good deal of discussion over the duplicate and triplicate mains. No allowance whatever was made for the triplicate mains and I think 50 per cent depreciation was charged against the duplicate mains. The total allowance for duplicate mains I think was only $66,000 out of a total of $3,602,000. The depreciation charge covered both the depreciation and obsolescence. I presume our reproduction cost was based on reproducing the duplicate and triplicate mains. I cannot conceive that we would have taken it any other way. I
294 should not consider that it would be reproduction unless we did follow that way. I cannot recall that we figured any extra cost in going beneath street railway tracks.

I cannot now recall that any allowance was made in the going concern value for the expense of developing the business. The fact that the company had paid three dividends did not enter into any estimate that I made of going concern value. I based my recent estimate upon the same elements as I based my estimate in 1908. Regardless of the fact that the city is about to begin construction of its own plant. I believe that the value is there if the city chose to avail itself of it. I believe that the construction of such a plant by the city would depreciate the present plant at least $10,000,000. I did not take that into consideration in determining the present fair value of the property. I presume that the city can build its own plant if it wants to, but I believe that it is impossible to do so at the price stated.

I understand that the D. U. W. Co. has been without a franchise for four years and the people have refused to grant it a franchise. It does not necessarily follow that any of that $10,000,000 depreciation has accrued. I believe that the value is as I have estimated it and I think when the citizens realize what a duplicate plant will cost that they will buy the present plant rather than spend possibly $20,000,000 in building and undergo the tearing up the streets incidental to laying new pipes and afterwards taking out the old ones. These facts had nothing to do with fixing my present valuation. They were simply brought out in answer to your question. Defend-

ants exhibit 1 seems to be a correct copy of a pamphlet that I have in my notes, known as the Harrison notes. The last item on page 8 reads property not in use for water works purposes, mostly lands, $174,870.00 I included that in my valuation for rate making purposes because I consider that it was used for water works purposes. There are several other statements in that circular that I think are inaccurate. On page 9, are certain figures as to water right values that certainly are not figures that I have used or would accept. I think the values set down for the lands at Platte Cañon intake works $3600 were tentatively agreed on by the board. The value given by McNeil and Sanborn for pasturage was $765. We valued it for waterwarks purposes. My own valuation was $5,000. I was not always the high man on the board.

Pamphlet shows $7,500 for Platte Cañon filter lands, McNeil and Sanborn $2,760. We were valuing for waterworks purposes, they for dry farming. McNeil and Sanborn did not value the
295 Platte Cañon Reservoir, submerged land. 3.22 acres in the Filter site was valued by McNeil and Sanborn as land in its original condition. The board valued it at $1,500 for waterworks purposes.

I do not believe that the pipe bridge that we valued at $6,000 could have been reproduced for anything like $2,500. Taking Defendant's Exhibit 1, right through it substantially represents the values agreed upon by the board.

I have said repeatedly that we did not arrive at the water right value by first agreeing on the total value and then deducting therefrom the physical value and the business and going-concern value. We valued the property as though the title were in the company, assuming that all question of titles would be settled. My best recollection is that we paid no attention to original cost of water rights any more than we would have considered that the filing fees represented the present value of a valuable mining property. We allowed no value for the item of service connections. Exhibit Z was made up for me. I did not ascertain independently of that exhibit what bonds had been disposed of or the total value of bonds for which discount was claimed. I considered at all times in valuing the property the element of value for the purpose of a municipal water supply for Denver. I believe that ownership of the power rights of the Littleton mill give the company a more efficient control of water for the Platte Canon ditch.

We had several tables of unit prices on the pipe lines. The price of pipe at the time of our appraisal was rather high, averaging I think $41 per ton. We allowed I think $35 per ton because we felt that the prevailing price was abnormally high. Defendant's Exhibit 3 is a copy of a tabulation of unit prices used by the appraisers on cast iron pipe. The cost of laying pipe and the pavement over it are determined together. My recollection is that we had a table of unit prices for wood pipe but I have not been able to find it among my tables. In my recent determination I took into consideration the fact that there had been a decrease in the cost of cast iron pipe but concluded that the increase in the cost of labor would just about offset

this decrease. So I let the old figures for the distribution system stand with the allowance for depreciation that I have mentioned.

I made the statement that the functional depreciation in this plant due to the construction of a new plant by the city would be about $10,000,000 as an appropriation. That would leave a junk value on the basis of my figures of approximately $5,370,000, consisting of lands, water rights, large pipes not under expensive pavement,
pumping engines, etc., I had given the matter consideration
296 before I went on the witness stand. I assigned the salvage
value in a rough general way. That is why I stated the figure as a round sum without making it precise. The method as I now recall was to estimate the probable junk value in round numbers. It is true in my judgment that the all-year-round use of the water supply of the D. U. W. Co. gives the greatest portion of the value to its water rights. The all-year-round use as to the reservoir water would not be affected by the city constructing a new plant and developing a new water supply. As to the other rights, some question of intermittent use might come in.

The all-year-round use of the water rights does not enter into the question of going concern value. The estimate that I made of $350,000 a year for operation and maintenance exclusive of taxes and depreciation is based upon judgment and upon an examination of the operating expense record of the company. It checked also with my judgment of about 25 per cent of the gross revenue for operating expense. I estimated that all current or ordinary repairs would be made out of the amount charged to operation and maintenance. Maintenance and depreciation are rather closely allied and not easy to distinguish. I do not believe that the depreciation allowance that I made is sufficient to cover all necessary maintenance as well as depreciation.

Redirect examination by Mr. Dorsey:

While I was engaged for more than 100 days on the valuation of the plant in 1907-8-9 the other appraisers were similarly engaged. The inventory of the plant was practically done for us when we arrived in Denver, so we took it around with us as we went about the works and I entered on my copies my own judgment as to the various features. As to many items of the inventory they were agreed upon between representatives of the city and representatives of the company before they were submitted to the board. The detail work of the board was divided up between the different members acting as committees.

The report of Mr. Fellows to which I referred as having had access to was the report of the board of engineers of the Public Utilities commission on the plant of the D. U. W. Co. By reproduction cost I mean the cost of reproducing a structure equally as good for the purpose or in some cases the same structure at the present time and the present prices of labor and physical condition. The elements of the plant on which we had original cost data were the Cheesman Dam, the pumping stations, and certain contracts for cast iron pipe. The original cost data was used in regard to such matters as the

tunnels under the dam at Lake Cheesman the fence around the reservoir the telephone lines, and various matters of that
297 kind, and due consideration was given to changes in the price of labor, etc. The duty of the appraisers under the ordinance authorizing us to act was to return merely a total valuation, not an itemized valuation. We made the separations that we did simply as a matter of convenience to the interested parties. The Harrison notes were not in any sense a report by the board of appraisers. Regarding the item of $12,000 allowed for the lease of the company's offices I have been told that the lease had been extended.

My judgment of the fairness of the allowance for going concern value was fortified by the fact that it checked out about 10 per cent of the value of the physical property. That is the average result obtained in valuation. I have awarded a much higher per centage however. I have no clear recollection of any allowance less than 10 per cent. When the board of appraisers allowed a valuation of $100,000 for business value they did not know that the franchise of the company would not be extended. Interest during construction would vary in time for which it was allowed as applied to various and different constructions. My recollection is that my figures for interest during construction were $893,000 and the board finally agreed upon $850,000. Engineering and contingencies are proper allowances in estimating reproduction cost. My figures for these were based upon 15 per cent but if I were doing it over again I should adopt a higher figure in view of my experience in the last half dozen years. The mechanical filters are doing better work today than they did in 1908, due to improvements in the art of filtration. I added no distinct increase in value to the former appraisal because of the increased value and utility of Marston Lake or of the water rights. The recent investigation was somewhat hurried and I thought that ignoring that increase would offset any possible error or oversight in depreciation or separation from the property. It was my purpose to be conservative.

Have stated that conditions surrounding the supplying of water in Denver are unusual as to abnormal consumption, variable and extremely small stream flows and excessive mileage of mains for population served. These conditions have to be met. The appraisement of 1907 was for two purposes, purchase and rate fixing. In that valuation the board made an allowance for paving over mains. Anyone reproducing this plant would have to go through these pavements in order to lay pipes. I think it is the proper practice. Pavement laid since the appraisal would increase the reproduction cost. I allowed depreciation on those pavements in the same manner as on the pipe. My recollection is that we made no allow-
298 ance for pipe under street railway tracks. The total allowance made for steam railways and river crossings was $61,000. The amount $174,870 stated in the Harrison notes as covering property not used for water works purposes was not a part of the report of the board of appraisers. I have no such notes myself and no knowledge of what Mr. Harrison may have had in mind. As to the bridge carrying pipe for which we allowed $6,000, my notes show

steel, 26,331 pounds in place at 10c., masonry, 305 yards, $3,000, excavation for piers, $400 total, $5,030 rounded out to $6,000.

As to the question of title in these properties, or water rights, the case is the same as a horse which is worth just as much no matter what the title of the owner may be. We had it very clearly in mind that we were not to inquire into titles. We were finding value and the company would have to quiet title before receiving payment. I have investigated to ascertain whether there were other reservoir sites as good and as available as the Cheesman site. Have also read the reports of the Public Utilities Commission Engineers, of Mr. Hunter, and Mr. Phillips, and have come to the conclusion that the so-called Two Forks site is the only available site. It would cost there to reproduce a reservoir equal to Lake Cheesman about $5,100,000. Whether the attitude of the city of Denver toward the company should be taken into consideration in fixing rates is a legal question which I do not undertake to decide.

Recross-examination by Mr. Nye:

I will be pleased to furnish a copy of the table that I have bearing on depreciation. The salvage value of pipe in the event of the city constructing a new plant would be in 12 inch or larger sizes. I do not know what percentage that would represent. I do not remember the exact basis on which $100,000 was allowed for the business value of the property. It was a compromise value.

The 60 inch, 48 inch and 36 inch pipe lines would have a salvage value in connection with Marston Lake. I do not know what percentage of cost that would amount to. The Newburyport Water Co. case in which going value was allowed was a purchase case, in which purchase was practically compulsory by act of the legislature.

The board of appraisers made two reports on rates. One established the leaflet rate for the remainder of the contract period, the other informed the parties of the inability of the board to agree on what would be a fair schedule of rates for a period of 20 years. In discussing the cost of the reservoir at the Two Forks site I
299 was discussing a reservoir of sufficient capacity to yield the same quantity as Lake Cheesman. A reservoir to hold the same quantity as Lake Cheesman could probably be constructed at that point for very much less than the figure named, but not one to conserve that quantity.

If the city were developing that project it probably would pay to incorporate a power scheme with it for civic uses, but there would be no real profit in developing water power.

Redirect examination by Mr. Dorsey:

In the question of water rates for the remaining franchise period we were called upon to determine which would be the nearest to a fair rate, the leaflet rate or the leaflet rate less 10 per cent or 20 per cent. We found the leaflet rate to be nearest fair but my recollection is that we were unanimous in thinking that it did not give

quite as much return as the company was entitled to. It is clear that we did not consider that it gave more than a fair return.

Witness MINARD LAFEVER HOLMAN.

Direct examination by Mr. Dorsey:

I reside in St. Louis, Mo.; profession, consulting engineer; graduated with degree of Civil Engineer at Washington University 1874. Prior to graduation I received a practical training as mechanic in stone, wood and machine work, and had experience in railroad construction. Became connected with the Water Department of St. Louis in 1877, continuing until June, 1899, the last 12 years as Water Commissioner and member of Board of Public Improvements. Built new intake works, pumping stations, and I established the practice of letting contracts for pumping engine contruction on the basis of guarantee by the manufacturer. Also constructed the sedimentation system for the works and constructed two large conduits. Visited European cities to examine methods of filtration there in use. Also planned reconstruction and extension of the distribution system. The work done outside of the distribution system involved total expenditure of about $10,000,000. While connected with the St. Louis plant I acted as consulting engineer for a number of other cities. Was a member of the board that planned the new water works system for the city of Cincinnati. Advised Chief Engineer Hermany of Louisville in the construction and design of the works there. Also advised Mayor Cregier of Chicago in the same capacity.

Was employed with Mr. Hermany and Mr. Benzenberg on a commission to design a new water works system in Kansas
300 City, Mo., in a controversy between the city and the company. The plant designed was never built because that activity forced the matter into the courts and to a settlement. Advised the city of St. Joe, Mo., in similar matters. Had charge of the works in Omaha, Neb. when they were taken over by the city by purchase, operating them until the regular operating force was organized. Designed distribution system for City of Mexico. Retired as Water Commissioner of St. Louis because of poor health. Since entering upon the practice of consulting engineer my activities have been along the lines of hydraulic plants, water works, steam pumping plants, electrical plants, etc. Am member of the American Society of Civil Engineers, American Society of Mechanical Engineers; past president of both. Am an honorary member of the American Waterworks Association and I think the only active charter member living.

In 1907 was appointed member of the Board of Appraisers who valued the property of The Denver Union Water Company, being associated with Mr. Freeman, Mr. Harrison, Mr. Stearns and Mr. Hazen. Mayor Speer called on me at St. Louis October 21, 1907. I suggested Mr. Stearns to act with me as representative of the city and suggested Mr. Allen Hazen as chairman of the board. The

board arrived in Denver November 8, 1907, viewed the property and worked here until November 29th. We returned to Denver on Dec. 11 of that year and worked until Dec. 21. The board next met in New York from February 5th to February 14th, 1908, where the question of water rights was presented by counsel for both parties. The next meeting was in New York June 3rd to June 20th, 1908, the last meeting in New York March 3rd to 26th, 1909. In addition to the work on the board I worked in Denver from April 17th to May 5th, 1908, February 15th to 22nd, 1909, representing the board on the water rate schedule. Inventories of the property were submitted to us and we checked them so far as possible by examination of the property, the board being divided into committees representing both parties for the purpose of agreeing on such inventories. On those inventories we applied our judgment and unit prices, finally arrived at the value of the plant. The data which came into my possession as member of the board I returned to the City of Denver at the request of Mr. J. A. Burnett, President of the Board of Supervisors in June, 1909.

The meetings of the board were held in New York on account of the poor health of Mr. Harrison. He is now dead. Mr. Harrison was formerly Chief Engineer of The Denver Union Water Company and in charge of the construction of Cheesman Dam. The printed pamphlet which appears in the bill of complaint in this case is a printed copy of the report of the Board of Appraisers on
301 the valuation of the property. Other reports related to rates.

Total valuation found by the board $14,400,000; $10,354,-075 for the physical property, $100,000 for the business value relating mostly to the business under contracts with former municipalities now part of The City and County of Denver; $1,100,000 for the going concern value, which is the value found in a live plant over and above the value of a non-operating plant of similar physical characteristics. The water rights were valued at $2,845,925. There is included in the report a valuation by Victor R. Olmstead and William W. Watson, representing the City and the Water Company, as to the value of the real estate within the city, and a similar report by J. B. McNeil and Burton D. Sanborn as to the value of the real estate outside the city.

Said reports were used as a basis by the board in forming its judgment as to the value. J. B. Hunter, City Engineer, and W. F. Hawes of the water company, submitted a similar report as to the mains constituting the distribution system. The board accepted that report as a correct inventory of the pipe, etc., in the distribution system. The board also made a report on the valuation of the water works property owned by the City and County of Denver. The value assigned was $315,000. The personal property, that is, furniture, fixtures, material on hand, etc., also was valued by committees, Mr. C. F. Read and A. E. Hamilton representing the city and company respectively on the small materials, furniture, etc., and Mr. Stearns and Mr. Harrison representing the city and company on the heavier materials for pipe system construction, etc. The board was very frequently divided into committees, one member representing each

party, to expedite the work under consideration. The Chairman of the board also handled many matters by himself.

The board caused excavations to be made to permit it to examine the condition of the underground structures. Total value allowed for land and structures at Lake Cheesman was $1,955,000. Land $200,000, structures $1,500,000, interest-during-construction $255,000. The Cheesman reservoir site is ideal and the construction is the finest I ever have seen in hydraulic work. I do not know of another site available as well suited for a reservoir as Lake Cheesman. I should say that a reservoir at Two Forks of the same working depth as Lake Cheesman would cost four times as much. The board, at the time it made its valuation, inquired very carefully into the yield of the water shed above Lake Cheesman and arrived, I believe, at the conclusion that the reservoir would yield about 59 second feet flowing constantly throughout the year. The reservoir site is un-
302 usually clean, the lake surrounded by several thousand acres of land which is fenced in. It is desirable to so protect the lake.

The board assigned a value of $673,805 to Marston Lake; land $158,550, structures $454,000, interest-during-construction $61,255. When this valuation was made the sole source of supply to Marston Lake was from Bear Creek. Since then the Company has constructed new diverting works in Platte Canon and a 48-inch pipe line to Marston Lake, increasing its ability to deliver water to that reservoir, increasing the value and utility of the property and generally the value of the water rights of the company because of the ability to increase the use. Marston Lake is a desirable storage reservoir in close proximity to the city. The distribution system was valued at $3,870,165. The depreciation allowance on the reproduction cost of the pipe system, as I recollect it, was 10 per cent. Generally the amount of accrued depreciation on the property at the time of the valuation was determined from judgment of the various members who made their computations in their own way. Generally, reproduction cost is based largely on the judgment of the engineer making the estimate. We duplicate the property capable of duplication, and as to equipment no longer manufactured or impossible of duplication, we substitute equipment of similar capacity and capable of doing similar work.

Such substitution is an exceptional case. The first effort is always to reproduce the exact thing. In ordinary cases that is what is estimated upon. That was the method employed in Denver. The valuation found included all property used and useful in the water works system. There was an item of $174,870 listed in the report as property not used for water works purposes, consisting of lands practically, that were held as useful in connection with the future development of the system or because of their bearing on the water rights situation existing here. One item in that was the Rough and Ready Mill property, valued at $33,700. Though not actually used in supplying water, it is very necessary for the control and protection of water rights. I cannot say positively whether the ranches owned were acquired in connection with the acquisition of water rights. To

bring that appraisement down to date I would take the value then found, and additions to the plant, deduct depreciation and add appreciation in those items of property that have appreciated in value. I have so far as possible examined company accounts and inspected the additions to the property that are visible, as indicated by Exhibit Z, and find that the charges for such extensions are proper charges to the property and plant account.

303 I should consider in addition to those charges that an allowance of 20 per cent for overhead charges would be fair. On that basis, using $10,354,075 as the physical value in 1907, adding the amount expended $1,744,841 plus 20 per cent, or $2,093,809 to this value and deducting for depreciation on the old and new plant $900,000, giving the present value of the physical property as $11,547,884. In my judgment, water rights have increased in value about 25 per cent since 1907, making the present value of water rights $3,556,406; going concern value at 10% of the physical property would be $1,154,788; making the total value $16,259,078, or basing going concern value at 10% of physical property and water rights it would amount to $1,510,429, thus making the total value $16,614,719. I think the last method should be the method used.

From experience, I have come to use 10% of the tangible valuation as the basis for going concern value. I understand that is the law in Canada and that is about what precedent has established in this country, or from 10 to 12½ per cent. The fact that The Denver Union Water Co. at present has no franchise does not affect the going concern value of the plant; it has nothing to do with the franchise.

From my experience in operating water works, I should want to spend at least $400,000 a year for ordinary operation and maintenance of this property. That does not include any allowance for depreciation or for taxes. A fair allowance to be set aside, out of gross income, for depreciation on this property is $180,000 a year. The gross income on this property, to permit of handling its business and properly care for the plant, should be about 10 per cent of the gross value, or $1,600,000 on the present value. That statement is predicated upon my experience in operating similar plants.

The inventory known as Exhibit C, prepared by Messrs. Anderson and Metcalf, I believe covers the same property as was valued by the Board of Appraisers in 1907, with the additions and changes that have since occurred. The estimate of $180,000 annual depreciation allowance was based on the useful life of the plant as it now stands and on the theory of its continuing to operate to supply water to the city; it includes the ordinary depreciation allowance and an allowance for the unforeseen contingencies which always happen and have to be met by an expenditure of money. It does not in any way take into consideration the loss that would occur on the property were the city to construct its own plant.

Cross-examination by Mr. Patterson:

I consider my experience and knowledge to be my business capital.

304 I was employed by The Denver Union Water Company as consulting engineer in this case on May 6th of this year. I had never been employed by The Denver Union Water Company since my employment by the city until I became connected with this case, nor had I been in communication with The Denver Union Water Company from the time this report was submitted until about May of this year. Until that time my knowledge of the property, tangible and intangible, was acquired as consulting engineer of the City of Denver. I received a fee of more than $10,000 for my work in connection with the appraisal from the city. My position in the present matter is exactly that of an attorney who takes a case for a client and in the course of business he may have to take the case against that client. After a lapse of six years, I see no ethical question in the matter. In discussing the makeup of the Board of Appraisers with Mayor Speer, I suggested and advised the selection of Mr. Stearns to represent the city with me. After the board arrived in the city on November 8th, we went to inspect Lake Cheesman, remaining there from the 9th to the 11th. We took the oath of office November 12th, 1907. We remained here 21 days, working practically 18 hours a day.

We returned to Denver on December 11th and remained until December 21st, working about 18 hours a day. I returned to Denver April 17th, 1908, remaining here until May 5th, starting the work for the preparation of the 20-year schedule of rates. The work done in connection with the valuation of the physical property was not confined to the two first visits to Denver. I did a great deal of work in my own office in St. Louis; the actual work in Denver covered 33 days. I also saw considerable of the plant and city while here in connection with the rate schedule, to get familiar with matters in the event that the city should take over the plant and want my services while organizing. The first meeting in New York, from February 5th to February 14th, was devoted practically to a discussion of water rights. At the second meeting in New York, June 3rd to 20th, we continued the work of estimating the value of the plant and property. At that meeting we got into a deadlock on a number of questions, water rights being the most important. Between that meeting and the final meeting I did a great deal of work in my office, and corresponded with the other members of the board, particularly Mr. Stearns, and with Mayor Speer in connection with the matters pending. I wrote to Mr. Hazen submitting my views of the water yielding capacities of Lake Cheesman.

This is a carbon copy of that letter.

305 I do not recollect whether witnesses and counsel appeared before the board at the final meeting in New York March 3rd to 20th, 1909, but I think they did. I do not remember whether City Engineer Hunter was there or not. We completed our first report on March 20th of that year. Mr. Stearns assented to all parts

of the report except the water right valuation. The Board fixed the valuation at $2,845,925 for the water rights without determining the question of ownership. It was not for the board to decide ownership. The question of title had to be adjudicated as in any ordinary transaction, at the time of the transfer of the property. I personally recommended to Mayor Speer that the property be purchased at the valuation fixed. The board did not make any such recommendations.

I remember that C. S. Thomas, counsel for the city, attempted to make the point that the company had no title or a very imperfect title to a majority of the water rights, but my impression is that the lawyers subsequently agreed that the board was not to pass on titles anyway. My recommendation to the city to purchase was without an investigation of title. I might advise you to buy a house but would not expect you to consummate the purchase without investigating the title. The board attempted to determine the value of the individual water rights but finally agreed on the value of the rights as a whole. The testimony concerning water right values presented to the board was on an irrigation basis. My personal position was that the value should be determined on the basis of their availability for a city supply. My recollection is that each man made his own computations up to the total value. We did not at any time attempt to ascertain what the water company had paid for any of the water rights enumerated. (Objection overruled.) I went on the theory that it made no difference what the water rights had cost. (Objection overruled.) The language used in the list of water rights which accompanies the report is the language submitted by the company in explanation of the list of water rights and is not the language of the board.

I am not able to state whether the water rights of the Platte Canon ditch belonged to agricultural land in 1889. It is my understanding that until then they were used for irrigation purposes only and from then on were applied to domestic and all-around-year use by the water company, by appropriation and use. The water of the Rough and Ready Mill ditch, in addition to being used to protect the company's water rights, has been used in running a flour mill at Littleton. My understanding is that this power water can be taken for the higher domestic use upon proper compensation; owning it, the water company would not have to compensate itself for taking it. A contract with the High Line ditch gave the company carrying
306 rights in the ditch from the intake to Platte Canon reservoir. The appropriation of 2.50 second feet, as of December 20, 1870, I assume was by the erection of pumping station and the use of water through the pumps for city purposes.

I do not know how much of 24 second feet appropriated for the Mississippi Street galleries was underflow and how much direct from the stream. My impression is that it was all underflow. I understand that the Cherry Creek appropriation was also for underflow. The company is also allowed, in connection with the valuation of these galleries, for all expenditures for structures. The water right valuation was in addition to this. I would not allow a similar value in St. Louis for water diverted from the Missouri or Mississippi rivers.

The laws and situations are entirely different. In determining these values we did not take into consideration the money expended by the water company for the acquisition of any of this property. We estimated the cost of duplication less depreciation, then added the value of water rights as distinguished from property and labor.

We were not interested in whether the water company had paid a dollar for those rights or not. We presumed that its filings were made in accordance with the law. That applies also to the 34-inch and 40-inch conduits. It is my judgment that the rate of consumption in Denver during the peak-load hours exceeds a rate of 200,000,000 gallons per day; the conduits are flowing uniformly during 24 hours a day and put into the reservoirs the excess quantities of water that is taken out during the peak-load. The 278.26 second feet power appropriation for West Denver pumping station is about 2.73 times the maximum daily consumption in the city of Denver. This water is put through the water turbines at West Denver and used to drive the pumps. 278 feet a second is not much water for this purpose. That amount of water for power purposes is a mere bagatelle. I do not know whether the turbines are being used at the present time or not. At the time of the appraisal we had data showing the amount of water pumped by those turbines. They can be used in connection with or independently of the steam pumps. The water power is used as it comes in handy in the regular operation of the station.

The appropriation for Lake Cheesman, as I understand it, permits it to take all of the water that will flow into it at any season of the year to the extent of its capacity, subject to prior appropriations. We did estimate the value of stock owned by the water company in the Harriman Ditch Company, the Soda Lakes Reservoir and Mineral Water Company, or the Bergen Ditch Company. Marston
307 Lake, with a capacity of 6,449,686,848 gallons, was supplied by the rights of the water company through the Harriman Ditch Company, Soda Lakes Reservoir and Mineral Water Company and Bergen Ditch and Reservoir Company. The Harriman Ditch Company has appropriations for the benefit of Marston Lake and 18 other reservoirs and supplies them according to its ability to obtain water from Bear Creek. The available quantity of water obtained through this right, the Soda Lakes and the Bergen Ditch rights, for Marston Lake, was, up to the time of the appraisal, comparatively small, as I recollect it. I do not recollect the details of the reference to the water bearing lands in the list of real estate. A communication from Walter P. Miller, Secretary of The Denver Union Water Company, addressed to the Board, called attention to certain additional water rights that were omitted from the original list supplied to the Board. The valuation reached by the Board was based upon the availability of the water supply under the rights for supplying the water works of The Denver Union Water Company. I can not now give you the detail of the methods used by me in arriving at my figures.

The third schedule in the report of the board of appraisers is the list and valuation of the lands outside of the city by J. B.

McNeil and Burton D. Sanborn. The board according to my notes agreed upon a valuation of $358,595. for the lands outside of the city. This value included surplus water rights for the ranch land. We did not use the valuations given by McNeil and Sanborn except as a preliminary step in making up our judgment as to value. McNeil and Sanborn did not value the lands for water works purposes. $358,595 was the value that we placed upon those lands for water works purposes including a value for surplus water for the ranches. We valued the water rights in the water rights list as water rights for municipal purposes and we valued in connection with this land the surplus water allowed to remain with the ranches. The water for municipal purposes was valued on the theory of being used 365 days in the year. Water for the lands on the theory of its being used probably 50 days in the year.

In my report to the finance committees of the Board of Aldermen and the Board of Supervisors of the City and County of Denver I state how the different items of value are distributed. The Phebe Strong Ranch containing 680 acres was valued with surplus water at $17,060. McNeil and Sanborn valued 480 acres at $5. per acre 74 acres at $10. per acre and 126 acres at $140 per acre. We allowed less for the whole ranch than was allowed by McNeal and Sanborn for 126 acres with water. The William Strong Ranch, 280
308 acres was valued by the board with surplus water at $16,125. McNeil and Sanborn valued 145 acres at $20,300; 135 acres at $1,350. Improvements at $500. Total $22,150.

The Becky Archer Ranch, 160 acres was valued by the board at $13,750. with surplus water. McNeil and Sanborn valued 130 acres at $18,200. 30 acres at $300. Improvements at $1,000. Total $19,500. The Frank Archer Ranch, 600 acres was valued by the board at $37,850. and by McNeil and Sanborn at over $51,000. The Harriman Ranch containing exclusive of the Harriman Reservoir, 812.8 acres was valued by McNeil and Sanborn at $69,078. and by the Board of Appraisers with surplus water rights and including the Harriman Reservoir at $40,300. A number of figures in my memorandum are identical with McNeil and Sanborn's figures.

This report of McNeil and Sanborn was used simply as a guide in making up our valuation. I think the water company has structures on all of the ranches (Erroneous computation by Senator Patterson as to acreage contained in the ranches. He takes total acreage and adds to it subdivisions of total under which valuation was made. He figures 303 acres in the right of way for Harriman Ditch Flume instead of 3.03). We valued the 782 acres at the Marston Lake Reservoir site at $156,400. That valuation is not out of proportion for reservoir purposes to other land in the vicinity. There are no other lands so well suited for reservoir purposes. We agreed on that sum because we believed it was worth that much for a reservoir site. Personally I took into account what it would cost to acquire that land under the law of eminent domain.

McNeil and Sanborn valued the Sullivan Reservoir Site at $1,000. We valued the site and the partly constructed reservoir and materials at $5,000. The Cherry Creek gallery lands contain 144.7 acres. I

am unable to state the length of the galleries. I don't recall the depth to which the galleries are sunk. We valued everything that inventories were presented for.

The right of way of the 40 inch conduit from Platte Canon contains 120 acres. I do not recall the length of the conduit. There is room for additional pipe on that right of way. I am unable to say whether Block 7 Weir Addition is used in connection with the water supply. I am unable to say what relation Plats 2, 7 and 8, Block 38, Eastern Capitol Hill Sub. had to the water system. I am unable to say what connection lots 11 and 12, Block 48, second filing Highland Park had had to *do* the water system. All of block nineteen, etc.

Cottage Hill containing 33 lots is the Cottage Hill tank prop-
309 erty. Partly used for a tank site and partly for additions. Those lots were valued at $15,850. I am unable to say whether lots 1, 2, 3, and the north 5 feet of lots 4 in Block 10, De Lanpe place are necessary. Lots 23-26 Block 50 University Park are the site of the University Park tank. I am not certain, but believe lot 19 Block 33, Witter's First Add. is part of the West Denver Pumping plant. The valuation placed on the 10.80 acres of the West Denver pump station was $43,200. And the valuation upon 5.39 acres of the tail race of the West Denver pump station was $10,780. 131.557 acres known as the Archer Lake Canal and Mississippi Street gallery lands were valued at $174,334.50. Lake Archer is used in connection with the hydraulic pumping plant at West Denver.

I think practically all of the 131 acres is occupied. How much is occupied by each class of structure I cannot say. As I recollect the tank has been removed from the Alameda tank site.

The Ashland Avenue Reservoir site contains 8.37 acres. Lots 1 to 11, Block 1, Re-Sub. of Lakeside is the Ashland Avenue Pump Station Site. Lots 7-20 block 5, and lots 28-40 block 6 Chamberlain's Capitol Hill Heights adioin Capitol Hill Reservoir. I take it from the language, they are not part of the reservoir. The residence of the superintendent and office and headquarters of the River Division are located on lots 25-44, block 3, Littleton Heights. It is quite necessary to furnish accommodations for the superintendent who must be available 24 hours a day the year around. The land occupied by and the structures of the Littleton Mill were valued at $28,700. This property is in connection with the Rough and Ready ditch for which we allowed an additional value of $5,000 for the water rights. All of the items to which attention has been called, whether used or unused, except such as have been sold, are included in my estimate of the present value of the plant.

My recollection is that the board did not attempt to verify the inventories or valuation of minor personal property which were turned into it. This inventory included furniture, tools, etc. at the ranches, at the Littleton headquarters, the operating office and elsewhere. The board itself placed the values on the pipe system, simply accepting the length of mains, etc. reported to it. Total mileage of distribution system was 397.001. The price per foot allowed on pipe was as follows: 2 inch, 20c, 3 inch 30c, 4 inch 55c, 6 inch 95c, 8 inch

$1.35, 10 inch $1,80, 12 inch $2.20, 14 inch $2.70, 15 inch $3.00, 18 inch $3.80, 16 inch $3.30, 20 inch $4.50, 24 inch $5.80, 30 inch $8.20, 36 inch $11.00 all in primary lines. The secondary and triplicate lines probably cost as much as the primary lines when
310 laid. The prices given were the prices per foot in the present condition of the mains. $35.00 per ton was the price allowed for the pipe new. Then we computed the cost of laying and added 15 per cent for contingencies and engineering. The $35 was the price allowed for the pipe strung along the ditch. The average market price of pipe in Denver at the time of the appraisal was $40.68 per ton. We allowed the 35 dollars because we thought that was the fair price for the period during which such works would be constructed. I did not consider it fair to use the temporarily fluctuating price. The depreciation rate that I used on the primary lines was 10 per cent. The triplicate lines we did not value at all. On the secondary lines my deduction for depreciation was $179,520. I am not familiar in detail with Mr. Metcalf's life tables of articles of that kind. I have seen quite a bunch of guesses of the useful life of property and have also made a few myself but I do not know of any cast iron rule for determining depreciation on a pipe system. That depends entirely on the nature of the soil. We have pipe in St. Louis still in use much older than any in Mr. Metcalf's estimate. There are all kinds of pipe for all kinds of pressure, new pipe of some kinds would now stand 115 pounds and old pipe of other kinds would stand more. There are several standards for water pipe adopted by different technical associations and prepared by manufacturers themselves. The figures that I gave per foot for different kinds of pipe were for the pipe laid in the ground. It does not included fire hydrants, valves, or pavements. The 2,640 feet of 24 inch wood main was estimated at $6,500. The 30 inch pipe line at $196,300. The 34 inch pipe line at $281,200. I cannot state the detail of the cost in Denver for the reason I have so often expressed that I sent all of the details and inventory to the City.

In determining the mileage of the distribution system, I did not include any part of the conduits within the city. There are nearly 10 miles of conduit within the city. Depreciation has been applied to the prices given. The total valuation on the distribution system including hydrants, valves and street paving was $3,602,735 exclusive of interest during construction. I stated before that I estimated 10 per cent depreciation on the primary lines, more for the secondary lines and no allowance at all for the triplicate lines. I took into consideration the life of the several pipe lines in estimating the depreciation and concluded after examining the soil and with a knowledge of climatic conditions that 10 per cent was right for the primary lines. The highest depreciation allowed was 100 per cent on the triplicate lines. We couldn't do any better than that. As I said before I allowed $179,520 for depreciation on the secondary lines, of which
311 there were about 21.9 miles. I did not estimate that the way the board did but we agreed so closely on the totals that I accepted the board's estimate. I have been a member of the American Society of Civil Engineers since 1888. I would rather lean

to my judgment in determining depreciation than to the judgment of a committee reporting life tables to the society.

80 years was my estimate of the useful life of the entire pipe system in Denver. That is a matter that is up to the judgment of the engineers engaged in the particular appraisal. When a man has had considerably longer practical experience in pipe than any one of the gentlemen reporting life tables to the society he is entitled to his own judgment. I cannot say just how many openings I made in Denver streets to ascertain the condition of the pipe. I would rather take my judgment based on the openings that I have made than estimates on the subject by the gentlemen who submitted these tables. They are trying to arrive at some general rule for the general guidance of young engineers coming up. My judgment in this case was based upon my examinations in this case, I know the climate, I know the condition of the ground and those things that go to effect the life of pipe. And I know the pipe business. Deterioration usually is caused by electrolytic action on the outside and tuberculation on the inside. Electrolytic action may be caused by the pipe becoming a primary battery in itself due to soil conditions or may be caused by a secondary current produced by some other cause, such as street railway systems. The ground here is so dry that you do not get the moisture necessary to set up electrolytic action. When I was here in 1907 I looked that point up especially. There are approximately 89.43 miles of paved and surfaced streets underlaid by mains of the water company.

The total allowance for paving over mains was $204,200. This allowance was made as part of the reproduction cost without reference to whether the pavements were down when the mains were laid or not. There are 605 fire hydrants owned by the city of Denver according to my memorandum at the time of the appraisal, and 2,687 owned by the water company. The hydrants owned by the water company were valued at $51 each and the connections at $43 each. Making a total of $94 for the hydrants connected with the system. This amount is with depreciation deducted. The allowance of $43 for hydrant connections was based upon examination made in 1907, to determine the average cost. I estimated the pipe system in an entirely different way from the estimate of the board, but agreed as to the total. The pipe in the secondary lines was
312 just as good as in the primary lines, the additional depreciation was charged because we believed that there were two pipes in some streets where one was sufficient.

I estimated the interest during construction on the principle of the loss on the money necessary to cover the cost of construction while the money was tied up in the works. The allowance of interest during construction on Lake Cheesman was $255,000. That was an amount agreed upon by the board. I presume each member had his own theory upon which he computed it. Where we agreed very closely on totals we did not discuss the theory involved. The total allowance for interest during construction on the distribution system was $247,430. The board agreed on that total. Lehow Lake is a small reservoir in Platte Canon just below the filter beds. It is con-

nected with the water system, overlying the cribs of the 30 inch conduit and the water from it percolates through those cribs. The total valuation placed on Lake Cheesman by the board was $1,955,000. $200,000 for land, $1,500,000 for structures, and $255,000 interest during construction. I am unable to say how much of that land was conveyed to the water company by special act of congress.

I think my valuation on that land was higher than $200,000. Mr. Stearns and I averaged $200,000 as near as I can recollect. I did not take into consideration what the company paid for that land. They might have discovered diamonds up there for all that I cared. It was not a question of what it cost with me, if they were fortunate enough to get it for nothing that was their concern. It did not make a bit of difference to us what was paid for it. We were here to appraise the plant, not to examine the water company's records. I do not know that the company paid more than $1.25 per acre for any of that land and I do not care. I know they settled some mining claims but I paid no attention to that. I do not know what the contract price was for the dam. I depended upon my judgment as to what the value of that land was in connection with the water works system. In addition to the dam there is at Lake Cheesman the tunnels, spillway, headgates, the usual paraphernalia of valves and gates and a small electric plant. My recollection is that the value on the electric plant was about $5,000. At the time of the appraisal I estimated all these matters.

The detail of those estimates is not in my possession now, I sent it all to the city. There are also the houses, office, etc. My recollection is that the interest during construction allowance on Lake Cheesman was principally on the $1,500,000 on the structures. The interest was allowed on our estimate of the cost of reproducing the hypothetical plant which we computed and depreciated to
313 find the present value of the present structures. The interest allowance was made without regard to the original cost. I want to be perfectly plain about it. It was computed on the theory of compensating for loss of interest on the money invested while the dam was being constructed. I do not recollect what the interest rate was at that time.

We estimated the value of the structures at Marston Lake at $454,000 lands at $158,550. Interest during construction $61,255. Total $673,805. That work is practically all earth work. Among the items were, 650,000 yards of embankment at 25c. $162,500. Riprapping $80,000. I don't remember the yardage. Puddle trench $25,000. Spillway $3,000. Gate houses, tunnels, outlet work, etc., $106,300. Gate house superstructure, $6,000. Boat house $3,000. Windmill well and tank $1,500. Fence $500. Telephone Line $500. Buildings, 5,000, and the Johnson Ditch, $2,000. I haven't the detail of the remaining items.

Wood Pipe lines should be kept constantly filled with water. They can be kept full regardless of the quantity they are carrying.

Archer Lake at the time of the appraisal was used exclusively as a power proposition. The 30 inch conduit is about 24 years old. We

allowed considerably more than 10 per cent depreciation on that conduit. The net valuation was $196,300.

The net valuation on the 34 inch conduit was $281,200.

The estimated reproduction cost of the 30 inch line was $327,100. The depreciation 40 per cent. The estimated reproduction cost of the 34 inch line was $468,700, depreciation 40 per cent. The Mississippi Street conduit reproduction $32,200. Depreciation 50 per cent. That is about the rate we applied. Those are my personal memoranda and all I can find here. I do not know what the company paid for those lines. In all of these appraisals we have allowed overhead charges, during construction. My estimate of $400,000 a year for operating expenses does not include taxes. Contingencies and engineering allowed in the appraised valuation was 15 per cent.

In the estimate of $400,000 a year for operation I include that part of the time of the Chief engineer and the engineering department that is devoted to operation. In the appraisal we considered all of the special castings necessary in connection with the construction of the distribution system and estimated them new at $65 per ton. I cannot say whether the estimate on pipe length agreed to by Mr. Hunter the city engineer included the length of the specials or not. The distribution reservoirs are the Ashland Avenue, West Denver and Capitol Hill Reservoirs. The valuation of which was $354,800. The Capitol Hill Reservoir was valued at $215,000.

314 I do not know whether it is located on land leased from the city or not. The pumping stations in the city were valued at $344,750. In valuing the distribution system we included 4,950 valves at $132,500. I do not know what the original cost was. The numbers are as follows, 2 inch 21, 3 inch 29, 4 inch 385, 6 inch 2,005, 8 inch 484, 10 inch 183, 12 inch 595, 14 inch 59, 15 inch 9, 16, inch 82, 18 inch 27, 20 inch 12, 24 inch 51, 30 inch 8. I think the cost of these is in document No. 46, which I transmitted to the city. Of the $1,200,000 allowed for business and going concern value, $100,000 was partly for the business of the company outside the Denver franchise that would be turned over to the city in the event that it purchased the plant. Part of it was the general business connection of the company. (The Master suggests that in as much as the item of $100,000 has been eliminated from the present value there is no need of further discussion of the $100,000.) Going concern value is based upon the fact that the undertaking is established with business and business connections. The various and different parts are in successful operation. It represents the difference in value of two similar plants, one of which has an established business the other has to bear the burden of establishing it. A concern may have a large going value though its gross earnings are such that it is losing money.

Going value includes the cost of the development of business. In the early days of all waterworks they have to spend both money and energy to get people away from their cisterns, wells and rain barrels. In my judgment the profits of the business cannot have been so large as to absorb the going value. In arriving at the present value of the plant I took the appraisers' value of the physical prop-

erty added thereto my estimate of the additions to the plant since then and deducted depreciation. I then added water rights and going concern value.

I started with $10,354,075 the amount fixed by the board as the value of the physical property. To which I added $2,093,809 my estimate of the additions to the plant since the appraisal, making the present day gross physical valuation of $12,447,884. From that I deduct $900,000 for depreciation giving as the present value of the physical property $11,547,884. The amount of the depreciation is my judgment of the depreciation that has occurred. (Detailed statement by witness of the items constituting the additions to the plant since the appraisal.)

The total book charges of the company for these additions was $1,774,841, to which I added 20 per cent for overhead charges. The detail of the book charges is shown by Exhibit Z. The item of $516,195.78 for distribution system I understand is all for new construction. $10,730.42 is for improvements to the Capitol
315 Hill works. $23,990 is for improvements at the Ashland Avenue works $22,676 is for miscellaneous work on the property of the S. P. C. & R. Co. $10,500 is for additional water rights acquired through the purchase of stock in the Soda Lakes Reservoir and Mineral Water Company. $15,489.18 is for new buildings at the Wynetka measuring station. $13,681.69 was for the interest acquired in the Mullen Ditch. $36,393 was for the extension of the 40 inch conduit to the Ashland Avenue Reservoir.

Discount and expenses on bonds sold to provide money for the construction $148,768.28. Then there is a credit against that of $39,770.90 for real estate sold. Then to the physical value found I added the water rights increased 25 per cent over the value found by the appraisers, making the present value of water rights $3,556,000. It is my estimate and judgment that $400,000 a year would be a fair allowance for the operation of this plant.

Cross-examination by Mr. Nye:

When I was engaged in 1908 on the sub committee on the question of water rates I represented the board of appraisers as a sub committee of one. Mr. Robinson represented the company in the presentation of data. No one represented the city unless I did. I spent in all about 30 days in that work.—All of the time in Denver. Mayor Speer was consulted during the progress of that work. I do not remember that Mayor Speer was out of the city at that time and that Mr. Burnett was acting mayor. I was in Denver on that work in 1908 from April 17 to May 5th and in 1909 from Feb. 15, to Feb. 22. After the February meeting Mr. Robinson and I went east together, going to New York by *by* way of St. Louis and Old Point Comfort. A report was submitted to the board of appraisers discussing the entire rate problem with a suggested schedule of rates in detail. The schedule was not adopted by the board, which finally reported that it could not agree upon a 20 year schedule. The board did agree on the adoption of the leaflet schedule for the balance of the franchise

period. 10 per cent going concern value was allowed on the property owned by the City of Denver which was then appraised by the board. My personal estimate on that property is as follows: Schedule, $266,025. Interest $18,275. Total $284,300. Going concern value 10 per cent, $28,430. Total $312,730. Agreed value placed at $315,000 by the board. Engineering contingencies, etc., was included in the $266,025. The value of the city's property was estimated on exactly the same basis as the company's property.

We did not take into consideration the cost to the company of the Lake Cheesman land. We did not consider that its use
316 in connection with a city water supply gave it its value. In my judgment the water rights have appreciated in value 25 per cent since the appraisal. The use of water has increased and in addition to that it is my judgment that the water rights themselves have increased fully 25 per cent. If they have not increased I am sorry for the city. In six and one-half years a property as desirable and as necessary in this part of the country must necessarily increase in value. I have not examined back of the appraisal to determine what the ratio of increase has been in the past. They will continue to increase in the future in a decreasing ratio until they reach their maximum value. Probably in 60 to 100 years. In my recent determination I took into consideration the same property as in 1908 less the property disposed of and plus additions. The appraisal in 1908 was for the purpose of purchase and sale. My recent appraisal was for the purpose of ascertaining the fair value of the property as a basis for determining the fair rate of return. The capacity of Marston Lake is approximately 1/5 of the capacity of Lake Cheesman.

The capacity of the reservoirs was not the element considered in valuation. It was the cost of construction less depreciation. The two situations are entirely dissimilar, and there is no basis of comparison. We accepted the sites as they were and duplicated the work on the particular sites without regard to whether the sites could be duplicated. In estimating the distribution system I estimated the fire hydrant leads separately.

The length of the hydrant leads was 64,488 feet for 2687 hydrants. I depreciated the hydrants 10 per cent. The difference in valuation per acre of the lands at Lake Cheesman and at Marston Lake was based upon the difference in location. In my present valuation I accepted and used the valuations made by the board.

Redirect examination by Mr. Dorsey:

I was designated by the city as an appraiser. The compensation of myself and Mr. Stearns was paid by the city. Mr. Harrison and Mr. Freeman were paid by the Company. The compensation of Mr. Hazen the 5th appraiser was shared by the city and the Company. I consider that I was acting more or less in a judicial capacity and not as an advocate for the city. None of the information that was conveyed to me at that time was confidential. (Objection overruled.) I expect to be compensated by the D. U. W. Co. for my time and con-

nection with this litigation. I do not regard myself as an advocate of the D. U. W. Co. I returned to the city all of the data that I collected and obtained as a member of the board of appraisers
317 on June 23, 1909. I have not had any of this data in my possession since it was returned to the city at that time.

The data returned to the city consisted of the inventory, arguments, affidavits, reports of Field, Fellows and Hinderlider, and all of the evidence that was presented to the board. It is due to the fact that I had returned this data to the city that I have been unable to answer some of the questions asked me on the Cross examination. I recommended that the city purchase the plant at the valuation $14,400,000. because I believed that that was the proper thing for the city to do. Personally I paid no attention to the claims of the water company that some of its water rights related back to 1870. But paid attention only to the total amount of water available for water works purposes which I determined on the record then available. (Objection overruled.) The Marston Lake and other reservoir sites were not valued by McNeil and Sanborn. Our values for the ranches were a little more than the dry land values given by McNeil and Sanborn and considerably less than the irrigated land values given by them because we valued the ranches with only surplus water rights.

It is good engineering practice in estimating work of that character to estimate the price of cast iron pipe on a basis of the average for a period of years. The price of iron pipe fluctuates considerably. The board assigned for 115,555 feet of secondary mains in the distribution system a valuation of $66,091. It is my method to determine the loss of interest on the average amount of the investment for the average period before the structure goes into use. I did not compute interest on the entire amount from the beginning to the end of the construction period. I do not pay attention, except as an element, to original cost in determining the reproduction cost for the reasons that works may have been built at a time of very high prices and the work may have been carefully conducted or not which cannot be determined. The difference is the distinction between cost and value. What we try to find out by the reproduction cost less depreciation method is what it would cost to reproduce the identical works at this time. Interest during construction is computed with respect to this theoretical plant. In my judgment the $900,000 deducted for depreciation is the total actual depreciation that has accrued since the former appraisal on both the old and new work. I stated as my opinion that the gross earnings of this plant should be $1,600,000.

In finding for the adoption of the leaflet schedule for the remainder of the franchise period we meant that the leaflet schedule more nearly approached an adequate return on the property than either of the other two proposed rates.
318 Lands adjoining Marston Lake aside from any value for reservoir purposes have a higher value than lands adjoining Lake Cheesman. It is also a fact that in the case of Marston Lake all except about 100 of the 782 acres are submerged while in the case of lake Cheesman only about 877 out of 8,400 are submerged. In

my estimate of $180,000 per year for depreciation, I included not only normal depreciation but also provisions for a contingent fund to meet unusual accidents etc. The items that I gave Senator Patterson as the expenditures on Marston Lake included everything except engineering and contingencies.

Recross-examination by Mr. Nye:

The board of appraisers in 1908 first determined the question of value and then with that as a basis took up the determination of the question of rates.

Witness ALLEN HAZEN.

Direct examination by Mr. Dorsey:

I reside at Dobb's Ferry, New York. Am a Civil Engineer. Obtained my training at the New Hampshire State College, Massachusetts Institute of Technology and at The Technical High School at Dresden, Germany. Have been engaged in the practice for 19 years, mostly in connection with public water supplies. Have made designs from which many million dollars' worth of water works structures have been built. Among them Springfield, Mass. Portland, Maine. Albany, Poughkeepsie, Yonkers, Peekskill, Nyack, N. Y. Toronto, Canada, Washington, D. C., Brisbane, Australia, and a good many others. Have been connected in an advisory capacity with plants in Boston, Mass. Hartford, Conn. New York City, Philadelphia, Harrisburg, Pittsburgh, Reading, Lancaster, Pa. Columbus, Ohio, Indianapolis, St. Louis, Minneapolis, San Francisco, Winnipeg, and Ottawa, Canada, Norfolk, W. Va., Baltimore, Charleston and Columbia, S. C. and many others. I have appraised water works at Portland and Augusta, Me. Gardner and Athol, Mass. Three works on Staten Island, N. Y. supplying what is now greater New York, Ithaca, Cortland, and Waverly, N. Y. and Des Moines, Ia. Racine, Wis. Newburyport, and Gloucester, Mass.

Am at present engaged in similar work on the property of the Spring Valley Water Company, San Francisco. Was chairman of the Board of Appraisers appointed in 1907 to value the works of the D. U. W. Co. (Statement of qualifications and experience of C. L. Harrison, another member of the board now deceased.) Four
319 members of the board, Mr. Freeman, Mr. Stearns, Mr. Harrison, and myself were connected with the planning of the works of the Panama Canal, having been appointed by the then President of the United States. The board of appraisers took up the question pertaining to the Denver works November 1907. The board met in Denver early in November 1907, spent some weeks going over all parts of the system, discussing its adequacy, efficiency, and all peculiarities of the system that would have a bearing upon its value, in examining plans and records of the company and collecting all possible information about it. Also made arrangements to have certain classes of property appraised by local men familiar with those items. In December the board met again in Denver continued the examination and took up the discussion of reproduction cost and

estimate of depreciation. Also received the reports of the local men assigned to appraise and report upon the extent and value of different items of property. In February 1908 the board met again in New York to take up the discussion of water rights. At this meeting evidence was presented on this phase of the matter. It was the desire of all parties at that time to have the appraisal completed within three months, but that could not be accomplished. There was another session in New York in June 1908 at which the value of water rights, the value of property and rates were discussed. It was the intention after that to finish the matter in Denver, both parties insisting that the last meeting should be held there. Mr. Harrison contracted caisson disease and his doctor would not permit him to come to Denver.

The meeting was postponed from time to time to see if he would not get well enough to come and finally the last meeting was held in New York in March 1909, and the matter determined as appears from the record. We had a very complete showing before us as to water rights, in the form of reports and affidavits and arguments by counsel. Several reports were submitted by Field, Fellows, and Hinderlider. All of the reports upon valuations made by local men are attached to the report on the value of the property, a copy of which was included in the bill of complaint in this case. The report was unanimous except as to water rights. The schedule of water rights in said report is a list of the rights claimed by the company.

It was not an agreed list. The list of city real estate was valued by Victor R. Olmstead representing the city and William W. Watson representing the company. Agreed to as to property and to value. List of real estate outside the city valued by J. B. McNeil representing the city and B. D. Sanborn representing the company, was agreed to as to property, and value of land for agricultural purposes.

320 The extent of the distribution pipe system owned by both the company and the city of Denver was agreed to by Mr. J. B. Hunter, City engineer and Mr. W. F. Hawes of the Water Company. The extent and value of personal property, furniture, fixtures, tools, etc. was agreed to by Mr. C. F. Read, representing the city and A. E. Hamilton representing the company. Messrs. Harrison and Stearns of the Board agreed to the extent and value of the material in the pipe yard. Mr. Harrison representing the company and Mr. Stearns the city. I think the board accepted their values.

The members of the board went over the entire plant from Lake Cheesman down and its investigations were such as to thoroughly familiarize it with the property and put it in possession of all facts necessary to enable it to determine its value. The value arrived at was $14,400,000 for the entire works, divided as follows: Physical plant, $10,354,075. Water rights, $2,845,925. Business and going concern value $1,200,000. The value of the physical structures was based upon the reproduction cost less the proper allowance for depreciation. So far as records were available we took into consideration original cost of the structures. This related particularly to Lake Cheesman and the Platte Canon structures owned by the S. P. C. & R. Co. which were of comparatively recent construction. It is im-

possible for me to state what weight each member of the board gave to the element of original cost. Each member reached his own conclusion and in all probability gave different weight to it. Agreements were reached on the totals.

The board asked for information as to original cost of structures other than the S. P. C. & R. Co. and got some schedules from the engineer's office, but it was impossible to determine from these the actual costs of particular structures, except in a few cases. That condition is not peculiar to the Denver works, but is very common in water works operations. The $10,354,075, included an allowance of 15 per cent for engineering and contingencies. 15 per cent is a reasonable allowance. Records of work as large, compiled since this valuation indicate a higher percentage, but this was accepted at the time by the board. The total value of the physical plant included also an allowance for interest during construction. Interest during construction is the estimated amount of interest lost on money used for construction from the time it is estimated it would be paid to the time when the plant is assumed to go into service and begin to earn a return. The different men had different methods of computing the interest but the total was finally agreed upon and distributed by the chairman among the different items in a way that most nearly represented the ideas of the different members. It is one of the
321 items of cost that must be reckoned on in the construction of works. $850,000 as interest during construction was the amount allowed by the board for the entire works. The board according to its best judgment deducted the depreciation that had accrued on each item of the property up to the time of the valuation. The lands within the city limits were taken at the valuations fixed by the two local appraisers.

As to the lands outside of the city the board took the report of McNeil and Sanborn as conclusive as to value for agricultural purposes and used that as evidence in forming judgment as to value for water works purposes. As to the Lake Archer lands we accepted the Olmstead-Watson valuation and the board valued the water rights separately. In valuing the reservoirs, such as Marston Lake and Platte Canon we took the land value for agricultural purposes into account in reaching a value for the purposes for which they were used. I do not know what the procedure of the commission may have been in those matters. I have my own judgment and took it on the basis of reproduction cost. Acquiring land for reservoirs is common and engineers who build reservoirs have experiences in the difficulties they meet and expenses incurred. The land to be used is ordinarily a specific piece, limited by topography and entirely different in its boundary lines from the lines of the property when divided among owners and it is necessary to partition the property to get what is wanted. My experience has been that if you take half a man's farm you pay as much for it as though you took it all and if you have to buy them out you pay more than the land would be appraised for, because if they are satisfied there is no object for them to sell and you must offer them inducements to make it an object. Ordinarily a reservoir site will cost

from 2 to 4 times the agricultural value of the land. Sometimes a reservoir site will have a special value very much greater than would be reached in that way, but such additional value would not be taken into account by the board in these proceedings. The Lake Cheesman site is a very excellent and unusual reservoir site.

It was the duty of the board to arrive at the total value of the property and not the value of the items. In the case of Lake Cheesman where the total value was much greater than the land and the structures, it is my judgment that that total value would have been the same regardless of whether the land and structures had been valued at more or less than they were. Ordinarily reproduction cost less depreciation is taken to mean the reproduction of the identical plant at the present time but that is not always carried to a strict conclusion at every point for that would result in some absurdities. It has to be applied along somewhat
322 broad lines and with reason. After ascertaining the reproduction cost less depreciation, we took into consideration the availability, reliability and efficiency of the works as a water supply in arriving at the values.

The term business value, used in connection with going concern, followed the word in our instructions which required us to value it. My recollection is that it included the unexpired portion of the franchise with the city and the unexpired portions of some other miner franchises and contracts, with several municipalities which have since become part of the city of Denver. The allowance for that value was $100,000. The allowance for going-concern value was $1,100,000. It represents the difference in value between this plant as it is and a plant identical with it as to physical structures but without the business or connections and not in operation. Going value is the same with or without a franchise. It has been called, cost of developing business, and that definition has a good deal of merit. I should not consider it altogether cost, although it is largely a cost item.

Members of the board investigated to ascertain the reliable yield from the water rights. It was one of the things taken into account in determining their value. There never was an agreement upon that question because there seemed to be no necessity for trying to reach one. The board made no determination as to whether or not certain of the water rights of the company related back to 1870 as claimed in the list furnished by Mr. Miller. Two questions as to rates were submitted for determination by the board. First, as to the rates to prevail for the remainder of the franchise period, whether it should be the leaflet schedule or that schedule less 10 or 20 per cent. Second, to establish a schedule of rates that would be fair and just for a period of 20 years. The board reported separately on each question. On the first proposition the board found that the leaflet schedule was the nearest approximation to a fair rate. On the second proposition the board was unable to agree on a schedule that in its judgment would be fair for 20 years. In making the rate investigation we used the valuation of $14,400,000 as the base to be considered with respect to what would be a fair return. We

deducted from the valuation of the company's property the item of $100,000 for business value. $175,000 for ranch and other properties not immediately necessary for water supply purposes and something like 25 or 30 thousand dollars for inventories, etc., in connection with the ranches. Then we added $315,000 being the appraised value of the works belonging to the city which it was proposed that the company should buy in carrying on its work. That all came out, omitting unimportant fractions, to the starting
323 point. I presume when we deducted the ranches and ranch property we deducted the income and expense that went with them.

(List of tangible property excluded in rating base, except the ranch inventories.) These amounts are the values which the board of appraisers put upon these several items. The rights of way for many of the main pipe lines through these ranches was not taken into account in this computation. But it should have been. There is advantage in the ownership of the ranches that would seem to make it well worth while for the company to own and operate them, but we did not consider that they were directly necessary in the waterworks business.

I have seen the property of the D. U. W. Co. on two occasions since that valuation but have not tried to go over it in a systematic way, as if I were valuing it again. Assuming that new work has been added to the plant as set forth in Exhibit Z, a fair allowance in addition for overhead expense on such work would be from 15 to 20 per cent. $14,400,000 represented the fair value of the plant at the time of the appraisal. To bring that appraisal down to date I should add the new construction and deduct depreciation and such items in the old appraisal as are not now there. If there was evidence of appreciation of items in the old appraisal I should add that appreciation. On that basis I estimate the present value of the property to be approximately $15,300,000. I estimate that a fair allowance for depreciation on the property today is $150,000 per annum. In 1907-8-9, the board of appraisers estimated the depreciation at $135,000 per annum. The estimate of $150,000 is for straight depreciation with no allowance for contingencies. It is the sum set aside to make good the loss from wear and tear from all causes other than those that are taken care of by ordinary maintenance, repairs, etc. It is my judgment that the ordinary normal operation and maintenance of the plant can be conducted for $350,000 a year at the present time, not including extra expenses for litigation and in connection with special troubles which might run anywhere from $20,000 to $100,000 a year. In looking over the accounts of the company I am satisfied that there are some accounts in the last few years that have not been charged into operation that really should have been, such as special litigation and matters of that kind. Of which, it has had an unusual amount in the last few years. It is my judgment that the allowance of $150,000 for depreciation is a fair allowance to meet the annual reduction in value that may reasonably be anticipated in the property.

If experience proved that greater depreciation had occur-ed after

a period of years, it would be necessary to raise the allowance. It is my theory that the depreciation allowance should be sufficient
324 to make good all loss in wear and tear of the structures to which it is applied. It is my judgment that should the City of Denver construct a competing water plant in the next five or seven years, the value of this property would be reduced to what might be called a salvage value at the time that the new plant gets its business. I believe a conservative estimate of that salvage value is from $5,000,000 to $6,000,000, and that the reduction in value of the present plant and property in that time would be from $9,000,000 to $10,000,000. In order to offset that loss accruing to the company by reason of its being obliged to continue in the business, it would be necessary to increase the rates fully $1,000,000 a year in addition to the normal depreciation allowed.

The water furnished by this system is excellent for the uses and purposes to which it is applied. I think the larger items of city property for which deduction was made in the rating base in the former appraisal have since been sold. The Harriman Ranch also has been sold. Were I eliminating from the present property for the purpose of a rating base those items regarding which there is any present question in my mind, the deduction would be something in the neighborhood of $150,000. If this deduction was made the earnings and expenses of the ranches should also be deducted from the income and expense account. So it would not make any practical difference whether this deduction was made or not. Marston Lake is a desirable and valuable reservoir, advantageously located and destined in the future to play a more important part than it has in the past, in the supply to the city, unless the city should build a new plant. The methods of purification used in connection with the water supply of Denver are approved and proper methods.

Cross-examination by Mr. Nye:

When acting as chairman of the board of appraisers I acted as a member of the board, having a view to the fair valuation of the property. Within certain limits I should have agreed with other members of the board if they had come together on a sum for value. After our inspection of the works the different members of the board except Mr. Harrison, were equally qualified to pass upon the values of the different parts of the plant. Mr. Harrison naturally because of having been chief engineer had information about it that it would be more difficult for anyone else to have.

We certainly respected Mr. Harrison's judgment as to matters about which he knew and told us, but when it came to matters of value of structures, I think every member of the board had his own idea. Defendants' Exhibits 4 and 5 were before the board but
325 were not used by the board as a basis for unit prices. They may have been used by members of the board and by Mr. Freeman but certainly not by the board. There were some differences of opinion as to unit prices. I used $35 a ton as a fair price for cast iron pipe, not because it was an average price over a period of years,

I think it is always well to consider averages but not well to always use them. I think a proper price at this time would be a little less than $35 a ton.

The tendency of the market for some time has been downward. If the estimate of value were to be revised from the bottom up at this time that price would be revised, also all other items. Some would be up and some would be down. It is my opinion that in a general way they would about balance. Bringing the former valuation down to date is an approximate procedure. In estimating the cost of pipe in the ground the different members applied their own prices based on their own experience in that work. I have with me a record of the prices that I used. I have not compared with defendants' Exhibit- 4 and 5. And do not know how they compare. Exhibit 3 seems to be an exact copy of page 7 in my note book for the estimated cost of reproduction of the pipe system. It was impossible to obtain accurately from the records of the company the original cost of different pieces of pipe laying in Denver. Exhibits 7 and 8 dealing with paving seem to be exact copies of pages 11 and 12 in my note book except for a typographical error of $4 in the last figure. Exhibits 7 and 8 contain the unit prices applied to the schedule of pavement over mains. It is my recollection that these were the figures used and agreed to. The board had practically agreed on the value of the physical plant within three or four months but did not finally agree on anything until they terminated their work late in March 1909. The board had before it the most complete showing in regard to water rights that I have ever seen in reference to a corresponding case. It is true that we did not accept the conclusions of Field, Fellows, and Hinderlider as set forth in their reports, but it is not true that their reports were rejected. They certainly were studied and given what the board considered careful consideration. It is true their conclusions were not adopted. The members of the board took into consideration the priorities of the company's water rights and the question of the all-year-round domestic use as distinguished from irrigation use in determining the water valuation.

There was no agreement on the question of all-year-round rights. Personally I considered the winter use a new appropriation initiated from the time that it began to be used. I based my value upon that theory. I know that the city disputed the claim of ownership
326 by the water company. The valuation placed on the lands at Lake Cheesman was $200,000 and on the structures $1,500,000.

I was aware that the lands cost less than $200,000. I remember that 7,600 acres were obtained from the government at $1.25 per acre. The board was of the unanimous opinion that the lands purchased from the government at $1.25 should be put in at that price plus the cost of fencing, acquiring, and carrying the property up to the date that the reservoir was put into use. There was no difference of opinion upon that point at all. The balance of the property, some hundreds of acres, had been acquired by the S. P. C. & R. Co. at a cost of $150,000. That cost Mr. Harrison told us he believed

was the cost of the land to those who had bought up the mining claims, the saw mill, and other property. And their carrying charges up to the time this work was undertaken. Of course, these costs go back of parties having anything to do with the D. U. W. Co. and we had no opportunity to audit that account. We had old maps showing mining claims across the site of the reservoir and we heard that these claims had been bought out at heavy cost. It was our understanding that these lands covered by the water in the reservoir, largely, if not entirely, had been bought by the company at an expense of approximately $150,000. This was one of the things that was presented to the board and considered. It was not controlling. Some of the members of the board believed that the site was much more valuable. All of the members of the board did not agree to the $200,000. The fact that the reservoir was used for supplying Denver with water was one of the elements of value, but there is another element quite as important. Someone went up there, discovered the site bought the ground, appropriated the water, built a dam, and got a water supply which in this locality is of very great value. Perhaps the value for other uses might not have been exactly the same but it would be large.

If the water company had been told in advance that its earnings were to be limited to cost of new works, then surely costs would govern, but the company was not so informed and as it is customary in American institutions for property to be rated at its worth, it seems to me that fair worth should govern and not original cost. I do not think that fair worth is created by the City of Denver and the use to which the reservoir is put. It is valuable for irrigation and other purposes beyond its cost. The cost of the structure was somewhat less than $1,500,000. The estimate of the board was the reproduction cost at that time and was somewhat more than the original cost.

327 The original cost was something like $1,150,000. Most of the increase was in the cost of labor, material also was higher. $255,000 was the amount allowed for interest during construction. I think all members of the board agreed on $100,000 for the business value. I should think there would be a difference in the ratio of going concern value to physical value in the case of a company that must educate people to use its commodity and the case of a company furnishing a commodity that everyone must have. I do not think that the fact that the company's franchise was about to expire has anything to do with going value. I know of no reason why going value should be different in a rate case than in a purchase case.

I first determined the value for purchase, then applied certain deductions and additions in determining the value for rating. I made that calculation personally and gave it to the other members. I think it was accepted but there was no agreement on it. Except for the changes stated the value was the same for purchase as for rating. My judgment was that the going value was approximately equal to one year's gross income. My method was really a consideration of the lack of income which a similar new plant would experience from the physical and business impossibility of starting business at its full

capacity. The item of $150,000. to which I called attention should be eliminated from the present rating case if the revenue and expenses of the ranches be also eliminated. Though it could be figured either way without any difference as I see it in the result. The company could sell the ranches retaining rights of away for pipe lines. The company could not afford to sell them with any claim on the water whatever. Owning them and using the surplus water in not very dry years, the company can operate them as wet ranches but could only sell them as dry ranches. I also included in that list for elimination the Littleton Mill Property. I did not include Lake Archer. Lake Archer and the power there is convenient to the operation of the plant. It is not essential. At the time of our inspection six years ago, that power was used all the time when there was water enough to operate it. I cannot say how it is now.

I think going value is an element of real value. It is also to a large extent an element of cost. And as an item of cost it seems to me that it is a part of the capital, that must fairly be taken into account in discussing fair rates. It is an element that grows out of the real conditions of the business and adds both to the value of the property and to the rates that are fair.

Going value is an element of value that stays with the plant all the time and you cannot write it off because of any earning
328 power that the plant may have possessed at any time during its history. In bringing my estimate of value down to date I excluded from the figures given in Exhibit Z. the item of discount on bonds. I did not make the same allowance for overhead expenses in addition to the charges shown in Exhibit Z. that I would have made had the company not been actively operating under organized management. The rates might be increased to offset the loss that would be occasioned by the city building a new plant without raising them to the point where the charge for the service would exceed the value of the service to the consumer. The actual value of water service rendered is enormously greater than the rates charged. Rates could be established to amortize nine or ten million dollars in from 5 to 7 years and still be fair to consumers. I do not think it is true that the fair value of water service to consumers is the fair return upon the capital necessary to construct a new plant. Denver if necessary could well afford to pay the whole value of this plant for one year's service if it could not get water otherwise. (Objection to question to the effect that company's rights were obtained for benefit of consumers overruled on the understanding that benefit of consumers be understood to mean for the purpose of supplying water to the consumers.)

I distinguish between what is a fair rate for the service and the value of the service to the taker. A payment of that magnitude would not be a fair rate for the service, but when it comes to discussing the value of the service I believe absolutely that it is worth that. I am taking into consideration that the consumers must have water but I think they could find other means of getting it if the supply was shut off. I know that since this company was organized down to the year 1910 it operated under a franchise which expired in that

year. I am not advised that the company since 1910 has operated at a profit. I have seen some schedules tending to throw light on that feature. I think it is true that the company operated with the knowledge that its right to operate was limited. I did not take that into consideration. I made my determination of value on the assumption that the company had no right beyond that which grows out of existing conditions and the necessity of the city for service. (Objection to question as to whether depreciation has accrued by reason of city's threat to build a competing plant; overruled. Exception.)

I do not recognize that any such depreciation has accrued up to the present time. The threat of the city to build a competing plant undoubtedly has reduced the value for which the plant could be sold, but the inherent value today is just as great as it ever was. I should say that such special amortization would commence at the time
329 that the rates were increased to provide for it. In this case the company believed until about a year ago, that it had a valid contract with the city which protected it from that procedure, so that process if it was the company's duty to follow it, would have started perhaps a year ago instead of four years ago.

Redirect examination by Mr. Dorsey:

The price of $35 per ton allowed by the board for cast iron pipe resulted from a consideration of the fluctuation in the price of pipe. It is proper to take such fluctuations into account. It is my recollection that the paving schedules before the board were agreed to between the city and company as to quantities but not as to values. No depreciation was allowed on Cheesman Dam at the time of the appraisal. It is my impression that there would be no depreciation on Marston Lake and perhaps on some other structures. Whatever the situation is, is because the board had determined from investigations that no depreciation had occurred. The property owned by the city valued at $315,000 was included in the rating base for the rates to be provided for the next 20 years.

I do not think that it was added when we were considering the rates for the balance of the franchise period. The company was paying the city rent for these pipes, so for that purpose it entered into the operating account. In discussing certain property that was essential or not essential, I construed essential as meaning absolutely necessary in the sense that it was indispensable under any circumstances. There is considerable difference between things which are reasonably necessary and essential for the purpose to which they are applied and things that are absolutely indispensable. Lake Archer is quite useful in connection with the property, without it the turbines at West Denver could not be operated. They are operated at present as a part of the plant. It is my idea that the net returns from the element of going concern value would be the same in a rate case whether you added that element to capital value or allowed a higher rate of return to compensate for its exclusion.

A rating base may be arrived at that does not represent the actual value of the property, but if the base was lower than the value of the property, then the rate of return would have to be higher in per cent

than if the actual value of the property was used as the base. Examples of that occur in England where under the older custom utilities were permitted to earn ten per cent on their cost which usually represented a lower but still fair rate upon their actual values. Theoretically the result was the same. Unusual conditions are met in Denver in supplying the city and its inhabitants with water. The
330 rainfall is very small, the amount of the water supply is limited. What is available has been largely appropriated under the laws which are different from other states so that it is very difficult to find a body of water suitable for a municipality that has not been appropriated or where the appropriations can be bought at reasonable prices and where the amount available is all in one place, or in a few places, so it can be handled economically and efficiently for a city water supply. It also is necessary to provide large storage reservoirs. The city is spread out so that the expense of the distribution system is great. And an immense amount of water is wasted in Denver. The consumption per capita is very much greater than it ought to be. In creating a water works system a very large initial investment must be made before any use of water begins. The item of discount on bonds is not included at all in my estimate of the present value of the plant. That expense however should be taken care of in the rates provided.

I assumed that that expense would go in with bond interest. It would necessitate an increased rate of return. The allowance of $350,000 a year for operation contains no provision for such expenses. I included in the loss of 9 or 10 million dollars that would accrue when the city put into operation its own plant whatever loss would be occasioned by the difference in the value of the water rights for domestic purposes over their value for irrigation rights, so far as such a difference may exist. It is very likely that the item of water rights could be disposed of for the full value for which they are put in this schedule. Perhaps they would go for more. But I cannot say at this time. The salvage would be in Lake Cheesman, Marston Lake, and the Platte Canon rights. There would be some relatively small salvage on the plant here and there.

I doubt that the company would show any profit on its business since 1910 after all the items that I think should be charged against income are marked off. My idea of profit is this, operating expenses, taxes, and depreciation should be marked off and also a sum equal to the interest charge at which the company can borrow on a sum representing the whole value of its property, after that any earnings would be profit, and in my judgment a reasonable profit is necessary and legitimate. Existing rates would have to be nearly doubled to amortize the loss of nine or ten million dollars which will occur from the city building its own plant.

Recross-examination by Mr. Nye:

The allowance for paving on primary lines was $175,600, on secondary lines, $28,600. In my valuation I treated the system as

though it were owned by one company paying no attention to
331 the fact that part of it was owned by the S. P. C. & R. Co. I did not consider that the accumulation of silt that had occurred in Cheesman and Marston Lakes was sufficient to constitute depreciation. I do not know whether the steam equipment at West Denver Pump station is of sufficient capacity to handle all of the work of that station. The use of meters would tend largely to stop the waste of water in Denver. It was my understanding that the company's contention in the case recently decided by the Supreme Court of the United States, was that the city should either buy its plant or grant it a new franchise.

Redirect examination by Mr. Dorsey:

The board allowed a valuation for pavement over mains, because we thought it was an essential part of the cost of reproduction and as such belonged in the estimate. The accumulation of silt in Cheesman and Marston Lake would be very slow. It is much cheaper to run the pumps at West Denver by water power than by steam. During the investigation by the board of appraisal the question of installing meters was urged upon the city and the company. We were instructed that the city was unalterably opposed to the use of meters and would not consent to a change to a schedule looking to their more general introduction. I knew at the time that the franchise gave the company the right to install meters under certain conditions.

Witness ABNER T. YOUNG.

Direct examination by Mr. Dorsey:

Am a civil engineer. At present General Manager of the San Louis Central R. R. for six years I was right of way agent for the U. P. Railroad and purchased rights of way along the entire system including some lands for terminals in Denver, Sterling, Salina, Topeka, Central City, Stromsburg, and many other cities and towns along the road. Appraised part of the terminal lands in Kansas City, Kansas, and Omaha, Nebr. As general manager of the Cheyenne Electric I acquired rights of way in Cheyenne and as Chief Engineer of the Colorado and Kansas R. R. I had charge of acquiring rights of way and terminals in Pueblo. I have charge of acquiring rights of way for the company with which I am now connected. Have recently had occasion to consider certain lands of the D. U. W. Co. with respect to their value for rights of way.

Exhibit A. 4. shows these lands extending from the Mississippi Street galleries on the south in a generally northerly direction
332 to the South Platte river where the tail race from the West Denver Station runs into the river. Archer canal and one of the conduits runs through this land. The conduit from the Mississippi Street galleries to the pumping station and the canal from West Virginia Avenue to the pumping station. Part of the land is occupied by lake Archer, indicated by the large green plat on Exhibit A 4. According to my information all of the lands colored on

the map whether yellow or red are the property of the D. U. W. Co. The land colored in yellow shows the continuous right of way through the lands owned by the company, including with it the land occupied by Lake Archer which would be particularly valuable for railroad shops and grounds. Discussion of objection to interrogation of witness as to reproduction cost of right of way. Overruled. Exception. My estimate of the cost of reproducing that continuous strip of land under present circumstances is $664,586. In determining that reproduction cost I took the separate tracts of land as the acreage was given me, arrived at the basis of valuation from the valuation of adjoining property plus what I considered a fair allowance for damage to adjoining property. There is no hard and fast rule for the settlement of right of way values. It is a matter largely of doing the best that one can with each owner. In running through a subdivided tract where there are a number of small owners the cost is much heavier than in a similar unsubdivided tract with one owner.

(Detailed statement by witness of methods used in arriving at his estimate of reproduction cost. The record itself is about as concise as it is possible to make the statement and convey intelligently an idea of the process.) In allowing damages to adjoining lands I assumed that the amount allowed would be the amount that would have to be paid in addition to the price of the land actually occupied, because of that damage which was bound to result from the use of land for rights of way. In my judgment it would cost fully as much to reproduce that right of way for water works purposes as for a railroad if not more, because the disadvantage of having the property cut up or cut off from the outside world would be there without any of the benefit derived from increasing the value of some land for trackage purposes.

The land at present occupied by Lake Archer would be particularly valuable for a railroad yard. I think the price stated would cover the cost — such right of way and consequently is its value. I have made no allowance in it for any buildings that might have to be destroyed and moved and I think I have been conservative rather than otherwise. I really believe that a million dollars would be a fair price for that strip as a railroad right of way. Giving
333 access as it does within one and three-quarter miles of the Union Depot and extending well to the outskirts of town and in view of the fact that it could be had without long legal trouble and the both or delay of condemnation proceedings. I estimated the actual cost of the land at $520,836 to which I added overhead and contingencies amounting to $78,125, and interest $15,625, being six per cent on one-half of the purchase price and overhead for one year.

Cross-examination by Mr. Nye:

I have not undertaken to identify or value the lands marked in red on Exhibit A 4. I estimated damages to the lands shown in red in the South East quarter of Sec. 9, adjoining the lands shown in yellow. Also in the N. E. ¼ of Sec. 16 and in the N. W. ¼ of Sec. 16. I also allowed damages there to lands that do not belong to the D. U. W. Co. but which would be damaged by reason of being cut

through at an angle. I did not estimate damages to the lands owned by the D. U. W. Co. in Sec. 15 lying east of the right of way because they would not be isolated and could be subdivided and used to advantage in that way. I allowed practically no damages to the land of the D. U. W. Co. in the S. E. ¼ of Sec. 16 west of the right of way between West Virginia and W. Exposition Ave. The right of way goes through there practically in a straight line and does not effect the balance of the ground. I estimated damages of 25 per cent to the land of the D. U. W. Co. in the N. W. ¼ of Sec. 22, south of Mississippi Street, basing its value as gravel land and not as filtration galleries to which use the land is now put. I took the land as though there was no present right of way there and if there was not there would be no filtration galleries. The line of the right of way is at present partly occupied by the conduit and partly by the Archer Canal. Part of the right of way is not now occupied by any structure. I am not prepared to answer whether a right of way of 100 feet is necessary for a conduit, except to say in a general way that I would consider it advisable in buying a right of way for a conduit to take at least 100 feet. I think the width of the Archer canal where it occupies the right of way is fully 50 feet. The water carried by the canal I assume could be carried through a pipe or covered flume, that is simply a question of expense.

I think this particular right of way would be especially valuable for railroad purposes, or for this company either. Were I acquiring a right of way into the city I would consider that a very fair entry. The maximum curvature, except at the pump station is 10 degrees. While at the pump station it would take a 16 degree curve which is not unusual in cities. I think a railroad company would be
334 getting that right of way very reasonably at a million dollars. I don't think the value of that right of way will ever grow less. The fact that the D. U. W. Co. owns the land indicated in red along the right of way does not increase the value of the right of way. The only ground that I consider valuable for railroad purposes outside of the right of way is that now occupied by Lake Archer.

I valued the portion of the right of way extending south from Mississippi Ave. at $1,500 per acre as gravel land. And the land just south of Exposition Ave. on the west of the right of way at $1,400 and $1,500 per acre.

Cross-examination by Mr. Patterson:

The infiltration galleries are between the west bank of the Platte River and the right of way. Part of the land north of the infiltration galleries could be used very nicely for truck gardens but I would say that most of it is more valuable for gravel than for truck gardens. I should say that for a third of the distance the land would be exceptionally good for truck garden. For a considerable portion of the distance the conduit is not in the right of way selected for railroad purposes. The Archer Canal commences about at the point where the channel of the river is marked as crossing the right of way. And from that point to West 4th avenue the conduit is not on the right

of way at all but at the edge of it for some distance. I paid no attention to the depth at which the conduit is laid. I was valuing the property. Streets and alleys could be laid out across the part where the conduit is. When you come to the ditch that is a different matter. The right of way to the north and west of the pumping station is simply the tail race.

If I were buying that right of way I would buy it just as cheaply as I could. But I am basing the price on what experience has led me to believe I would have to pay. The right of way for the conduit where it adjoins Lake Archer is about 30 feet and with the embankment of Lake Archer about 20 feet. I am not prepared to state whether that is sufficiently wide for a conduit right of way. They get along with it now and I would not consider it advisable to get an additional 50 feet. I am not prepared to answer what width is necessary from a water company view point. For a railroad the 100 feet is necessary.

Redirect examination by Mr. Dorsey:

If I had assumed damages on the theory of the ground south of Mississippi St. being used for an infiltration gallery the allowance would have been greater. I marked out the lines shown in yellow on the map to indicate where the railroad right of way would be.
The coloring was done by a draughtsman for the water
335 company. If the right of way had followed the line of the conduit, it would not have affected the cost. I simply swung the right of way as far east as possible from Alameda Avenue south to get a better river crossing.

North of Alameda Avenue the open ditch is on the right of way. I don't know anything about the width requirements of a pipe line right of way but I should consider it good business judgment in buying a right of way to buy for the future. The right of way is not in the river bed any part of the way.

Recross-examination by Mr. Nye:

In valuing the right of way I did not consider the water company in the matter at all. I simply considered the cost of acquiring such a right of way and yard room from land owners. I might equally as well have considered a strip paralleling this strip owned by other parties. I simply considered this land as though in the same condition and applied to the same uses as adjoining land. This land will be worth as much for right of way purposes, if abandoned by the water company when the time comes that another railroad wants entrance into the city and that time will surely come. From an operating view point I should say that it would be a disadvantage to a railroad company to have that conduit on the track or near. From Exposition Ave. to the West Denver pump station there would be no material interference with the right of way by reason of the conduit. I considered that the right of way would damage the lands of the D. U. W. Co. at the Pump Station site between west Alameda and W. Bayaud avenues and also South of west Alameda

and north of the river. $10,000 approximately would cover the damage to the land of the D. U. W. Co. except at the pump station, where I estimated the damage at $31,400.

Redirect-examination by Mr. Dorsey:

The total length of the right of way is approximately 4 miles and it contains 78.05 acres. I very much doubt if another right of way into the city from that direction of the same length and giving the same advantages could be obtained for that sum of money. Most any other right of way would run through some built up districts where it would cost from $10,000 to $15,000 a mile for buildings destroyed. Also there are very few street crossings affecting this right of way which is a great advantage.

336 Witness, ARTHUR D. WALL.

Direct examination by Mr. Dorsey:

Have been engaged in the real estate business in Denver for 26 years. Principal activities in land and irrigation matters. Am familiar with values of lands, irrigated and non irrigated in the vicinity of Denver. Have recently investigated the value of certain lands said to belong to the D. U. W. Co. and listed in Exhibit C. of these proceedings, beginning at page 111, the items being designated by numbers. My investigation was confined to the lands outside the city of Denver, excluding the lands at Lake Cheesman.

The valuations placed upon the lands by me were for use for farm and ranch purposes. They are worth much more for the use to which they are dedicated in many instances than for the purpose for which I valued them. Item No. 2, page 111, 152.624 acres was valued for grazing land at $765. Item No. 3, page 111, 306.65 acres generally pasture land with small areas suitable for farming are valued at $3,065. Item No. 4, page 111, consisting of two parcels, 7.768 acres valued at $115, and 85.25 acres at $8,525 or $100 per acre, including the water right of 1 cubic foot per second in the High Line Ditch. This valuation was made without the regard for the fact that this land is occupied by the Platte Canon Reservoir. Item No. 5, page 111 two parcels 3.22 acres valued at $100 per acre from which was deducted the value of water right necessary. 11.06 acres valued at $340. All of these lands under the ditches and reservoirs of the D. U. W. Co. are provided with water rights which are subject to use for domestic purposes when needed, only surplus waters being applied to the land. The irrigable lands therefor were appraised as with water rights attached. A deduction of $60. per acre has been made to cover the difference between a first class water right and a surplus water right. Item No. 6, page 111, 22.99 acres 16 acres valued at $100 per acre and 6.99 acres at $20 per acre. Net valuation after deducting for water rights $780. Item No. 7, 19.95 acres valued at $300. 10.03 acres at $155. Item No. 8, 13.08 acres practically all submerged by Lehow Lake valued at $520. Net.

In my judgment these various prices are the fair market values of the lands for agricultural and grazing purposes without regard to the uses to which they are now put by the water company. Item No. 9. Phebe Strong ranch containing 680 acres, 126 acres at $18,900. 554 acres of pasture land $5,540. Total $24,440. Making deduction of $7560 for the difference between a first class and a surplus water right on 126 acres leaves $16,880. plus $1200 for farm building making the total net value of the ranch $18,080.

337 Item No. 10, page 111. William Strong Ranch 280 acres. 145 acres of irrigated land valued at $21,750. 75 acres of pasture land $750. 60 acres of bottom land $1200. Total $23,700. Deducting $8700 for the difference between a first class and a surplus water right on 145 acres leaves a net value of $15,000 plus $800 for farm buildings making a total net value of $15,800.

Item 11 Page 111. The Becky Archer Ranch, 160 acres. 130 acres of irrigated land $19,500. 20 acres of pasture land $200. 10 acres of bottom land $200. total $19,900. Deducting $7800 for the difference between a first class and a surplus water right for 130 acres leaves a net value of $12,100. plus $1000 for farm buildings making total net value of $13,000. Item No. 12 Frank Archer Ranch 587.60 acres 320 acres of irrigated land $48,000. 225 acres of pasture land $2250. 42.6 acres bottom land $850. Total valuation $51,100.

Deducting $19,200. for the difference between a first class and a surplus water right leaves a net value of $31,900 plus farm buildings, $6,000. making total net value $37,900. In our opinion the farm buildings cost two or three times that amount but we questioned if a place of that size would as a farm proposition stand an investment of over $6000 for farm buildings so we placed that value on them. Item No. 13, page 112, Mountain Reservoir site 810 acres, valued as pasturage at $6,075. Did not take into consideration its availability or desirability as a reservoir site. Item No. 14, page 112, dam and headgate Harriman Ditch at Morrison, 11.84 acres valued at $1,000. Bear creek runs through the land, the Colo. and Southern R. R. along its northern boundary. The adjoining land is platted into lots and blocks. Parcel No. 31, Jefferson, a 20 foot strip along the Harriman Ditch valued at $50. Item 15, page 112, Harriman Reservoir, 130 acres valued at $16,250, as irrigated land including water rights; deducting $7800 for the difference between first class water rights and surplus water rights leaves a net value of the lands of $8450.

Item No. 16, page 112, Marston Lake Flume 7.58 acres a 50 foot strip through 3 choice farms valued at $1137. Item No. 17, page 112. Marston Lake reservoir lands, 840.224 acres 740 acres valued as irrigated land, $111,000. 67 acres $3350. 33 acres at $330. Total valuation $114,680, deducting $44,400. as the difference between a first class and a surplus water right leaves a net value of $70,280. plus $1500 for farm buildings makes a total net valuation of $71,780. There are other buildings on the grounds that are used for water works purposes, which we did

not value at all. Item No. 19, page 112 Sullivan Reservoir site. 80 acres valued at $2000.

338 This land can be irrigated from the Castlewood dam project which fact was taken into consideration. We allowed no value for the partly constructed reservoir. Item No. 20 page 113, 147.04 acres. 20 acres with a water right from the High Line Canal valued at $2000. 40 acres of bottom land, $2000. 87.04 acres creek bed land, $870. 3 brick houses in poor repair $1500.

Deducting $500. for the value of the water right leaves a net value of $5870. Item No. 34, page 114, and page 115. 40 inch conduit lands, 20 acre tract Woodbury land valued at $1500. (Detail of valuation by tracts.)

Total valuation for right of way, fee title, $17,118.75. Valuation of separate parcels were made according to the value of adjoining lands. Items No. 35 page 115. 6th conduit lands 9.926 acres $2,930.40. Item 36, page 115, 7th conduit lands, aggregating 17.5 acres total valuation, $1,978.85. Item 34, 35, 36, are lands owned in fee by the D. U. W. Co. for rights of way for its several conduits. Item No. 37, page 115, describes 58 miles of conduit rights of way for which easement only is owned by the D. U. W. Co. which is valued at $300 per mile or a total of $17,400. Making an average value for the rights of way of $50 per acre. The values to which I have testified are in my judgment the present fair market value of the lands for farming and grazing purposes. The total valuation of the several items concerning which I have testified is $235,625.

Mr. Charles W. Bowles was associated with me in the valuation of these lands. He inspected the lands with me and we agreed upon the values in each case. In placing the valuation on the conduit lands owned in fee we took into consideration damage to the owner of adjoining lands. But in no other case. Exhibits A5 and A6 showing lands acquired by the D. U. W. Co. subsequent to Jan. 1, 1908 and prior to Oct. 31, 1913, represent lands that are included by us in our valuation. Have been associated with and had experience with irrigation and water rights ever since my boyhood. There has been a marked increase in the value of lands since 1894. There was an increase between 1894 and 1907, it applied to lands in and about Marston Lake and in and about the Platte Canon works. I know of many cases where land values have doubled. I don't think that is true in all cases, there has, however, been an increase in all cases.

Cross-examination by Mr. Nye:

1894 was a particular low year in land values. It was perhaps 1897 before the lands got back to normal after the panic slump.

339 The fact that what are called bottom lands are sub-irrigated producing better feed had something to do with our valuing them higher than upland pasture lands. Parcel No. 8 in Item 34 and parcels 21 and 22 in Item 35 have not been sold. $75 an acre is not a special value for the Woodbury lands because of

its location and proximity to the city. We did not actually take measurements to determine whether the 40 inch conduit is on this 20 acre plat or beside it. All the other parcels in Item No. 34 are used by the conduit for right of way which varies from a minimum of 50 feet to a maximum of 200 feet, the latter occurring where there are valve houses and meters, etc., and only for short distances.

In the cases of the rights of way where we considered that there was no damage to adjoining lands we allowed none. In the case of the reservoirs and other works we did not take into consideration any effect upon adjoining lands. I visited the Platte valley ranches on June 19, at which time they had good crops and appeared to be well kept up. I have been familiar with them for 20 years. I made this valuation since this hearing commenced.

Dedirect examination by Mr. Dorsey:

In reproducing these rights of way either in fee or easements the question of damage to adjoining lands, must be considered and paid. Lands in the localities discussed were worth more in 1907 than in 1897 and are worth more now than in 1907.

Recross-examination by Mr. Nye.

There has been very little change in land values in the last few years.

Witness, ARTHUR D. WALL recalled.

Direct examination by Mr. Dorsey:

In valuing the Platte Canon Ranches we took the acreage of the different classes of land as given us by the Superintendent in charge checking it roughly by observation and also with the acreage heretofore fixed by other appraisers. The acreage in the Phebe Strong, William Strong and Becky Archer ranches agree with the acreage valued by McNeil and Sanborn in connection with the former appraisal. As to the Frank Archer ranch our irrigated acreage is 320 theirs 300 that additional acreage probably has been placed under the ditch. Our bottom land acreage is 42.6 theirs 35 acres. There is a difference of 12.40 acres in the total acreage of the ranch because a strip of land has been taken out for rights of way for cer-
340 tain conduits. I have prepared a list in the nature of an abstract of the various instruments by which the property constituting the water works system have passed from one company to another. Said abstract Exhibit A 62 offered and admitted. Exhibit A 63 is a similar abstract of instruments relating to the chain of title of the water rights of the D. U. W. Co. Offered and admitted. I have resided in Colorado 26 years and have been connected with irrigation matters ever since I came here. Was first employed in the office of a company making loans on real estate, afterwards by the Colorado Mortgage and Investment Company, the greater part of the time in charge of their lands and ditches and reservoirs. That is the company which built the High Line Canal. Since leaving that company about 7½ years ago I have continued

to deal in land and irrigation investments, particularly the latter. During that time have been a director or officer in one or more irrigation companies. So have been in touch with the management and operation of irrigation works and the purchase and sale of water rights. Been particularly in touch with these matters in Water Districts 2 and 8 immediately above and below the city of Denver. Also have some knowledge of water rights on the Cache La Poudre, Big Thompson, St. Vrain, Boulder Creek, Clear Creek and Bear Creek. Have been secretary of the Consolidated Ditches Company of District No. 2 for eight years. Am familiar with the priorities and the available water supply in Platte River, and with the lands to which the water of the river and its tributaries is applied or might be applied. Am familiar with the value of lands with and without water supply and with the value of water rights in this vicinity. Am familiar with Lake Cheesman, have visited the site before, during and since construction. On the basis of 60,000 acre feet annual yield, which figure is between the estimates of the two engineers who have estimated the yield from Lake Cheesman, I believe the water to be worth $60 per acre foot, or $3,600,000 for the entity, including structures, lands and water rights. Lake Cheesman being a stream bed reservoir has a great advantage over reservoirs not located in the bed of a stream.

The majority of the reservoirs in Colorado, I should say 95 per cent of them are not stream bed reservoirs. Nearly all irrigation reservoirs are created by earth dams. Cost of maintenance and operation of Lake Cheesman, the dam of which is of masonry, would be infinitely less than any reservoir I remember having seen. I am familiar with a number of such reservoirs.

The location of Lake Cheesman above the headgates of all of the ditches on the Platte River gives it another great advantage.
341 Water from it could be delivered to the headgate of any ditch desired on the stream without the formality of exchange and the attendant trouble. There are lands in the vicinity of Denver not now supplied with water or insufficiently supplied that would absorb the water from Lake Cheesman at the price I placed upon it. Am familiar with Lake Marston and with the Platte Canon, Bear Creek and Turkey Creek rights of the Water Company. Assuming that through a combination of the Platte Canon, Bear Creek and Turkey Creek rights and Marston Lake there could be made available from Marston Lake during each and every irrigation season 44,000 acre feet of water. I should consider those water rights and property necessary to produce them worth $2,400,000. It has been my business to be familiar with the flow of the Platte River above Denver for something like 20 years. I have investigated the various water rights of the D. U. W. Co. with a view of determining their yield.

Have gone over the figures of Mr. Geo. G. Anderson and have checked certain of his figures with records that I have kept myself. I have made my own analysis of the yield capacity of Lake Cheesman dividing the storage season on a different basis than has been used by others in their analyses. My division occur-ing in the mid-

dle of the irrigation season instead of at the beginning of the calendar year. Handled on that basis the reservoir produces a total storage of 870,000 acre feet in 14 years from 1900 to 1914 or an average of 62,140 acre feet annually. 1902 was a year of excessive drought which the intelligent farmer looks for once in awhile like a hail-storm or a pestilence of grasshoppers, and to meet which it would not be wise to make provision for excessive storage capacity. Eliminating that year the average annual yield from the reservoir would be 65,800 acre feet or 83 per cent of the total capacity of the reservoir. I have used as a foundation for my estimate the figures prepared and testified to by Mr. Anderson in this case. I have not made any computation on the basis of Mr. Comstock's figures. I know of no irrigation reservoir approaching the size of Lake Cheesman of equal efficiency, as compared with the total capacity of the reservoir. I am familiar with the yield capacity of the other water rights of the D. U. W. Co.

An examination of the records of the Platte River for the past 26 years eliminating the year 1902, show- there have been only three months during the irrigating seasons when the flow of the Platte River, fell below the point where the Platte Canon Ditch would be able to take its full capacity during the irrigating season. These three months were, Oct. 1889, Oct. 1901, and Oct. 1903. This ditch may therefore be assumed to have 100 per cent efficiency
342 during the irrigation season, which after deducting water for 300 acres under the ditch not owned by the D. U. W. Co. which must be supplied with water gives it an annual capacity in the irrigation season, of 22,500 acre feet, and in the non-irrigation season of 15,221 acre feet, after making deductions to cover the times when the ditch was not fully supplied, or a total of 37,500 acre feet per annum. To be used through Marston Lake, which with the supply from Bear Creek excluding the Soda Lakes supply would bring the total for that re-servoir to 44,300 acre feet. On which I have placed a value of $2,400,000 equivalent to $60 per acre foot for 40,000 acre feet.

Am also familiar with the supply from the Mississippi Street galleries, which I estimate to be capable of producing 7,700 acre feet during the irrigating season and 4,500 acre feet during the non-irrigating season or a total of 12,200 acre feet for irrigating purposes. The water in the irrigation season could be applied direct through ditches below Denver or by exchange with the stream through ditches above Denver. The non-irrigating season flow would have to be stored. Storage capacity is available below Denver. Have made similar investigations of the Platte Canon galleries. The irrigation season flow of which would amount to 4,200 acre feet, the non-irrigating season flow 2,700 acre feet or 6,900 acre feet per annum. The water could be made available in the same way as that from the Mississippi street galleries.

Have also investigated the yield capacity under the independent rights of conduits Nos. 2 and 3. I came to the conclusion, basing my judgment on the efficiency of flood water ditches, that these conduit rights could supply an average of their capacity for

30 days each season, making in round numbers 4,000 acre feet per year. Also investigated the yield capacity of the Cherry Creek galleries, and concluded that they are capable of yielding 3,400 acre feet during the irrigating season and 1,200 acre feet during the non-irrigating season, or 4,600 acre feet per annum.

In arriving at a value for the gallery and conduit rights I considered only the summer flow and placed on them a value of $500,000 including the structures necessary to divert the water, the valuation upon which is included in Exhibit C. Am familiar with the water rights listed as item No. 11, at page 117 of Exhibit C. This is a 50 acre water right out of the High Line Ditch, which I valued at $25 per acre or $1,250 for the right.

The total value which I placed upon all of the water rights that I have enumerated is $6,500,000. including the land and structures necessarily appurtenant to the handling of these rights. The value of those lands and structures as set forth in Exhibit C by Messrs. Metcalf and Anderson was $2,784,393. leaving for the water
343 rights alone a net value of $3,700,000. The market value of the 100 shares of the Harriman Ditch Company stock owned by the D. U. W. Co. is $30,000. $300 per share. This is already included in my valuation of the water rights for Marston Lake. The value of the 110 shares owned by the D. U. W. Co. in the Soda Lakes Reservoir and Mineral Water Company is $27,500. or $250 per share. I did not include the Soda Lakes supply in the supply that I determined could be obtained from Marston Lake. On the basis of market value the 72 shares owned by the D. U. W. Co. of the stock of the Bergen Ditch and Reservoir Company are worth $14,400 or $200 per share. The water yielded by these rights is used entirely for irrigation purposes and I did not include it with the city supply. I also investigated the capacity and efficiency of the Harriman Reservoir upon which I found a value of $34,000. Deducting $8,450 for the value of lands appurtenant to the reservoir leaves a net value for reservoir structures and water of $25,550. That is not included in the valuation for city purposes because the water is used entirely for irrigation purposes. It like the Soda Lakes right could be used for city purposes through Marston Lake if necessary. The 20 acre right out of the High Line Ditch for the Cherry creek land is valued at $25 per acre. It is used entirely for irrigation purposes and not included in the value for city purposes. Rights under the High Line Ditch are not considered first class water rights. Farmers owning them are supplementing their rights with reservoir rights. I do not consider myself competent to place a value on the power rights of the D. U. W. Co.

Cross-examination by Mr. Nye:

Have been connected with the Consolidated Ditches Company for 11 years, ever since it was organized. Have been secretary for 8 years. It is a protective organization embracing practically all of the ditches in District No. 2. 19 companies in all. Am familiar with their structures and rights and during the past 8 years have assisted in protecting those rights through litigation and otherwise.

We never had any litigation with ditches in District No. 8, but have had with ditches in the South Park Country in District No. 23. The ditches in District No. 2 have not all had a full supply of water during the past 8 years. The older ditches have but the later ditches have had a limited supply. The ditches in the 70's have not had a full supply and the ditches in the 80's have had a comparatively short supply.

344 It has not been short every year. They have not been short this year. As a rule the ditches in that district have sufficient capacity to carry their full decrees. I estimate that the rights of the D. U. W. Co. are capable of furnishing a sure supply of approximately 120,000 acre feet per annum. The land which would absorb that supply for irrigation lies adjoining the city of Denver, primarily on the east and north, or east and northeast. There is some land to the west. I don't know how much of that supply has been furnished annually through the system of the D. U. W. Co. to the city and county of Denver as a domestic supply. I should say that from ½ to 2/3 of the water furnished the City and County of Denver passes back into the river near Denver in the form of sewage and seepage. That all goes to help make up the supply for the ditches below Denver. I don't believe that a change from a domestic to an irrigation use of this water supply would effect the capacity of the rights of the D. U. W. Co.

I have not considered the duty of water in my estimate of value because I have assumed that this supply, capable of being delivered at any time and at any point on the Platte River, is more valuable as a supplemental than as an entire supply. I would want to provide at least 1½ acre feet in order to deliver the acre foot to the land. In fixing a value I assumed that the purchaser would pay the expense of delivery and absorb the loss. I am confident that there is sufficient acreage below Denver to absorb all of this water at the prices that I have mentioned.

The price of dry land around Denver depends entirely upon its location and various local conditions. It will run all of the way from $10 an acre up to several hundred. I would say that there are 5000 acres in the vicinity of Montclair and Aurora and between Denver and Littleton that is dry land, suitable for country homes, etc. that could not be bought for less than several hundred dollars an acre. The land that I have in mind extends out for a distance of perhaps 20 or 25 miles and runs in price from $10 an acre up to $100. The $100 an acre land would be adjoining or close to the city limits. The are perhaps 2000 or 3000 acres of this land. I don't know a piece of land capable of irrigation from the High Line Ditch that can be bought as cheap as $10 an acre. The entire eastern end of the State is physically under the High Line Ditch. I couldn't tell how long it would take to dispose of the rights of the D. U. W. Co. at $60 per acre foot. It would not take very long to develop the lands which would consume this water. A con-

345 siderable portion of the land is at least partially developed now. I satisfied myself that Mr. Anderson's figures which I used as a base were conservative. The quantity of water that I esti-

mated as available for storage was the quantity available during the entire year. Not only in the non-irrigating season. I made my figures from the middle of one irrigation season to the middle of the next, dividing practically at July 1st. I don't know how much water was actually stored in Lake Cheesman in each of those periods. It was full a considerable portion of the time.

I did not distinguish between storage in the irrigating season and in the non-irrigating season. In eliminating the year 1902 for the purpose of another consideration I looked upon that year and its unusual drought as a sort of calamity which occurs only once in a great while. The only year comparable with it so far as any one's memory goes being 1864. 38 years previous. On the same theory there would be no excuse for eliminating the highest stream flow, because after the reservoir was once filled it makes no difference if a million acre feet came down, it could not be taken. In a number of years there was available for storage more than the capacity of Lake Cheesman. In 1900 about double, in 1909 about 3 times, in 1912 about double and the present year. I assumed that 130 second feet must be passing Platte Canon in order to entitle the Platte Canon ditch to its full appropriation in the irrigating season. Practically no water would have to pass the ditch in the non-irrigating season. I assumed 100 per cent efficiency for the Platte Canon Ditch in the irrigating season. In the non-irrigating season the efficiency depends on the quantity in the stream.

In determining the efficiency of the Platte Canon Ditch in the non-irrigating season I deducted 10 per cent and the odd figures over even thousands, I did not make any assumption as to whether the flow from the infiltration galleries in Platte Canon was a part of the stream flow or was underground flow. The galleries are below the mouth of the canon some distance. I estimated their capacity at 4200 acre feet, during the irrigating season. That is approximately 10 cubic feet per second. That is the amount supplied on the average by those infiltration galleries. I would not know how to determine how much water would have to pass Platte Canon in addition to the supply of the Platte Canon Ditch to supply those galleries during the winter months.

In determining the quantities of supply from the Mississippi Street galleries and the Platte Canon Galleries, I assumed the use of water from those sources both in winter and in summer, and for the other conduits assumed the existence of rights by appro-
346 priation and actual application. Also that there was on an average a supply equal to the total capacity of those conduits one month each year. That was flood water, when every other appropriator prior in time had been supplied. I considered in that connection both the capacity of the canal 600 cubic feet and the amount usually drawn by the High Line Ditch.

I did not attempt any definite determination to ascertain on exactly what days that water would be available for the conduits. I simply used as a basis other flood water rights. The High Line is in that class. I did not allow for the High Line drawing 600 feet during all that period because in the actual operation of the ditch

it is not probable that it would draw its full appropriation. I managed the High Line for 13 years and I know that it does not always draw all the water it can get during the irrigating season. In fact today it is drawing about ½ what it could get under its priority because the water is not needed.

Lands under the High Line ditch have not a first class water right, because water is not available when most needed. The average quantity diverted annually is ample for the 30,000 acres provided with water rights, but it is not deliverable at the right time. The aggregate of all the values assigned by me was $6,501,250. That included the lands and structures directly appurtenant to the handling of the water. I included the headgates and the 60 inch conduit.

The net value of the water assigned by me was $3,715,607, which I treated as $3,700,000. The $15,607 thrown off would more than cover any small items of land that might have been omitted in estimating the extent and value of the physical structures appurtenant to the water rights. I assigned a total valuation of $500,000 for the water rights attached to conduits Nos. 2 and 3, and the three infiltration galleries. It would require storage to make available the winter flows from the infiltration rights. But in making my computations I excluded the winter flow. In considering the summer flow from these different sources I assumed that the flow would be constant throughout the irrigation season. It is true that some of the months of the irrigating season require more than one-seventh of the supply of the season. If storage were provided to so distribute the supply from the infiltration works, the value of the rights would be higher. I have only assumed that water would be available for such acreage as could be properly irrigated with that supply distributed in uniform quantities day by day. I have been employed by the D. U. W. Co. for about 3 months in connection with the preparation of the evidence in this case. I have gone to
347 other points outside of Denver and procured witnesses in the matter of water rights.

Redirect examination by Mr. Dorsey:

By procuring witnesses I mean that I had asked persons whom I knew to be experts in their line to act as witnesses in this case. I have a wide acquaintance among men connected with irrigation matters. By shortage of water in the case of the ditches in District No. 2 I meant that they did not have sufficient water for their needs. The 120,000 acre feet annually that I stated to be the available supply under the rights of the D. U. W. Co. include the 4,000 acre feet that I attributed to Conduits Nos. 2 and 3. The variation in price of dry land from $10 to several hundred dollars per acre, depended primarily upon proximity to Denver and transportation lines. Other local conditions had something to do with it.

Adjoining the city and convenient to transportation lines the lands afford locations for suburban homes, intense farming, etc. I am of the opinion that 1914 will prove to be the year of highest stream flow of which we have any record. I stated that 130 cubic feet per

second must pass Platte Canon before the Platte Canon ditch could divert its full appropriation. The 56. feet of the appropriation of that ditch is included in the 130 second feet. In the winter season the Platte Canon Ditch can take all of the water in the stream up to the 56 feet. The supply of the High Line Ditch would be an ample supply for 25,000 or 30,000 acres if it could be so arranged that the water was available just when it was needed.

Recross-examination by Mr. Nye:

I know that as a matter of practice for a long term of years the Platte Canon ditch has diverted up to the full volume of the river in the winter season and there have been no demands upon it to turn out water. I am basing my statement as to what it can do in the future upon what it has done in the past. I exclude the power rights because the prior power rights are owned by the same company, except as to one-half of the old Platte and Denver Ditch. The Smith Ditch is not ahead of the Platte Canon Ditch.

Redirect examination by Mr. Dorsey:

I am not aware of the provisions of the agreement that exists between the D. U. W. Co. and the owners of the other one-half of the power rights of the Platte and Denver Ditch.

348 Recross-examination by Mr. Nye:

The total water rights outstanding under the Highline Ditch are for a trifle over 30,000 acres. Of these I should say that all but 4,000 acres are in good standing.

Redirect examination by Mr. Dorsey:

I ceased to be active manager of the High Line Ditch about 8 years ago. I am still a director of the company.

Witness CHARLES W. BOWLES.

Direct examination by Mr. Dorsey:

I reside one mile west of Littleton. Have lived in Colorado since 1868. Am a farmer. Have been a member of the School Board in Arapahoe County three different terms and was county commissioner for eight years. Am familiar with the value of farm lands in that vicinity. I accompanied Mr. Wall in a recent inspection for the purpose of valuing certain lands said to be the property of the D. U. W. Co. We did not include the lands in the vicinity of Lake Cheesman.

The valuation placed upon the land was for farm and pasturage purposes, without regard to the use to which they are put by the D. U. W. Co. for water works purposes, except in the case of certain conduit lands. The lands and the values placed upon them are as follows: Item No. 2, 152.624 acres valued for pasturage purposes.

$765. or five dollars per acre. Item No. 3. 306.65 acres valued for pasturage with some tracts along the river suitable for farming at $10 per acre $3,065. Item No. 4. Platte Canon Reservoir Site, 1 parcel 7.768 acres valued at $115. Another parcel 85.25 acres valued net at $7,275, after deducting a water right for 50 acres from the High Line Canal. Item No. 5. Platte Canon Filter site, 3.22 acres at $100 per acre $320. 7 acres at $100 per acre $700 and 4.06 acres at $15 per acre $60. Item No. 6. 22.90 acres valued at $780 net after deducting water rights. Item No. 7. 19.95 acres $300 and 10.3 acres $155. Item No. 8. Lehow Lake 13.08 acres $520. Item No. 9. Phebe Strong ranch 680 acres, 126 acres of irrigated land valued at $150 per acre, $18,900. 554 acres of pasture land valued at $10 per acre $6540. Total $24,440 from which we deducted $7560 for the water right on 126 acres leaving $16,680 plus $1200 for farm buildings, making a net total valuation of $18,080. Item No. 10 William Strong ranch 280 acres 145 acres of irrigated land valued at $150 an acre $21,750. 75 acres of pasture land $10. $750. 60 acres of bottom land $20. $1200. Total $23,-
349 700, deducting $8700 for water rights for 145 acres, leaving $15,000 plus $800 for farm buildings, making a net total valuation of $15,800. Item No. 11. Becky Archer Ranch 160 acres 130 acres of irrigated land $150, $19,500. 20 acres pasture land $10. $200. 10 acres of bottom land $20. $200, making $19,900 total value, deducting $7800 for water rights for 130 acres leaving $12,100. plus $1000 for farm buildings making a net total valuation of $13,100. Item No. 12 Frank Archer Ranch 587.60 acres. 320 acres of irrigated land valued at $150 $48,000. 225 acres pasture land $10. $2250 42.6 acres bottom land $20. $850. Total $51,-100. deducting water rights $19,200 for 320 acres leaving $31,900. plus $6000 for farm buildings leaving a net total value of $37,900. Item No. 13 Mountain Reservoir Site. 810 acres at $7.50 $6,075. We found that a great deal of work had been done there towards the construction of a reservoir, but we valued it solely for pasturage purposes. The values that I have placed upon these lands are in my judgment a fair and reasonable market value on them at this time for agricultural and grazing purposes without regard to their use for water works purposes. Item No. 14. Harriman Ditch headgates. 11.84 acres $1000. This land is in the town of Morrison and would be valuable for resort purposes. Item No. 31. Jefferson, Harriman Ditch fencing this strip of land 20 feet wide three or four hundred feet long valued at $50. Item No. 15. Harriman Reservoir 130 acres $125 an acre, $16250. deducting for water rights for 130 acres $7800 makes net total value $8,450. Item No. 16. Marston Lake flume 7.58 acres runs through three fine farms, valued at $150 per acre $1137. Item No. 17 Marston Lake Reservoir 840.224 acres 740 acres valued as irrigated land at $150 per acre $111,000. 67 acres at $50 per acre $3350. 33 acres $10 an acre $330. Total $114,680. deducting water rights for 740 acres $44,430 leaving $70,-280 plus $1500 for farm buildings leaves a net total valuation of $71,780. There are a number of other buildings on this land used for water works purposes but we did not consider their value. I

may say in connection with the 67 acres that we valued at $50 an acre that I sold that land to the company and they paid a great deal more than $50 an acre for it. The values that I have given for these Bear Creek valley lands are in my judgment the present day fair market value, for agricultural and pasturage purposes. Not considering at all their use for water works purposes. In valuing Marston Lake, Harriman Lake and the Platte Canon Reservoirs. We valued them on that basis though they actually are used for reservoirs. We did not take into consideration the reservoir structures upon those lands. Item No. 19. Sullivan Reservoir site.
350 80 acres $25. per acre $2000. We found a large reservoir partly constructed on it but did not take that into consideration. The land lies under the Castlewood irrigation system and close to Denver. Item No. 20. Cherry Creek gallery lands 147.04 acres. 20 acres with a water right under the High Line Ditch at $100 per acre $2000. 40 acres along the creek at $50 an acre $2000. 87.4 acres creek lands $10. $870. Total $4,870, less $500 for the High Line Ditch water right making net total value $4,370, plus $1500 for three brick buildings in poor repair, making agreed total $5,870. Item No. 34. 40 inch conduit lands. We valued the 20 acres of the Woodbury tract at $75 an acre $1500. without water rights. That land can be irrigated from the Agricultural ditch it lies just east of Loretto College. Platte avenue runs along the north side of the land.

As to the acreage irrigated and un-irrigated on the different ranches we accepted the statement of the superintendent in charge for the D. U. W. Co., whose estimate I was willing to take. My testimony would be the same in all respects as the testimony of Mr. Wall with regard to the valuation for the rights of way owned in fee for conduit No. 3. Also as to Item No. 35, conduit No. 6 lands, and Item 36 conduit No. 7 lands. In valuing these lands we considered the damage to adjoining lands where there was any. Anybody attempting to obtain a right of way of this sort would be obliged to pay such damage. The amount of the damage we added to the acreage price of the land. The total value arrived at for the fee rights of way for those three conduits was $22,028. Item No. 37. Rights of way owned as easements. 58 miles valued at $50 per acre or $300 per mile. total $17,400.

The total valuation allowed for all of the lands outside of the city for farming and agricultural purposes, except as to the conduits, where damage to adjoining property was included was $235,625.

Cross-examination by Mr. Nye:

I think those lands would sell at the price placed upon them within a reasonable time. My father sold a good deal of land to the water company. The waste water from the Marston Lake filters supplies water to a small lake owned by me which I use for irrigation. I am neither a bond holder or a stockholder in the D. U. W. Co. At one time I owned some South Platte bonds which I received for some Soda Lake stock. That was in 1907 I think. I soon disposed of them.

The 11.84 acres in Morrison adjoins the buildings in the town, and runs up stream about a quarter of a mile above the town. The works of the water company occupy only a small portion of
351 the land. Unless the remaining land was used for protection of the intake works it is not in use at the present time in connection with the water system.

I consider the dry lands are worth the price we assigned to them.

Witness EDWARD R. CONAWAY.

Direct examination by Mr. Dorsey:

I reside in Denver. Have been engaged in the real estate business for about 2[illegible] years in Denver. Buying, selling and dealing in lands and lots in and about Denver. Am familiar with the value of lands and lots in and about the city. I have had experience in appraisals for various purposes. Besides private appraisals I was one of the commissioners for the opening of Cherry Creek Drive from Broadway to Colfax Avenue, and from Colfax Avenue to Blake Street, on the Colfax Viaduct Commission, and in behalf of the Burlington Railroad and the Moffat Railroad. I have recently investigated certain property said to belong to the D. U. W. Co. for the purpose of determining its present value. And have arrived at that value on the basis of so much land without regard to its use for water works purposes. The values arrived at are as follows: Item No. 21, Ashland Avenue Reservoir. 8.37 acres at $600 per acre. $5,022. There is a reservoir constructed on the property which was in no way considered in valuing it. Item No. 22 page 113 Exhibit C. The Ashland Avenue Pump Station 11 lots $1500. Item No. 23. De Lappe place pumping station site. 3 1/5 lots $200 a lot $640. Item 24. Cottage Hill Tank site, 43 lots $150 each total $6450. Item 25. West Denver Pump station. Item 26. Tail race from West Denver Pump Station, Item 27, Lake Archer Canal and Lands all of them contiguous property indicated on Exhibit A4, were valued as follows: Item No. 25, $48,570 No. 26, $9,432.50. Item No. 27 $212,,191.95 total for the three parcels 25, 26, 27, $270,194.45 (The value of each item included in the parcels is set out.) The value assigned is the land value alone without regard to the use to which the land is put or the fact that it constitutes a continuous strip, and without consideration of the fact that if one should undertake to reproduce a continuous strip like that damages would have to be paid to the owner of adjoining property which was cut up or otherwise injured. I have included nothing for the structures on the property. Item No. 8. University Park Tank Site, four lots, $75 each $300.
Item No. 29. South Denver Pump Station site 14 lots $75
352 each $1050. Item No. 31, storage tank site Highland park, 2 lots $250 each $500. Item No. 32. 46 lots in Cottage Hill, $150 each $6900. Item 32. 24 fractional lots adjoining Capitol Hill Reservoir, $350 for the whole piece. The values assigned are the reasonable market values at which the property could be disposed of in a reasonable length of time but not at a forced sale.

Cross-examination by Mr. Nye:

If the company was ready to sell and the buyer was ready to buy the prices that I have fixed would be the fair value for the property. I do not believe that the land adjoining the lands shown on Exhibit A. 4 constituting an equivalent strip could be purchased for the figures that I have placed upon this property. If another water company or a railroad wanted to come into the city from the south and paralliel this property taking an equivalent amount of land it could not be reproduced in my estimation for anything like that figure. It would cost much more. If I were to value that entire property as a unit I would put a greater value on it. Roughly perhaps 50 per cent more. That is only a guess. That property would be particularly valuable for a railroad right of way but I did not take that into consideration in determining these values. My valuation was simply on the separate parcels as if they were in the same situation as adjoining properties, absolutely without regard to the use to which the land is put. I valued the larger parcels higher proportionately than those that are split up into small parcels, because large tracts are always worth more than small tracts similarly situated. As to the portion lying south of Exposition Ave. which is 100 feet wide, I based the value on the acreage value of adjoining property. The 6.06 acres in the narrow strip south of West Exposition Ave., I valued it at $1250. an acre. It could not be used for anything except a right of way. The tail race item 26, was valued for just the acreage it contained. I valued that at $1750 an acre. It is more valuable as a right of way than for any other purpose. I just took the adjoining lot value and discounted that. I did not add anything to it for the special purpose for which it is used and I did not take anything from it.

Witness EDWARD R. CONAWAY recalled.

Direct examination by Mr. Dorsey:

In the 24 years that I have been in the real estate business I have had to do with loaning money and obtaining loans on city real estate. Before the panic of 1893 the loans of the firm with which I was connected ran into the millions, in recent years the
353 volume has decreased materially. I am familiar with the prevailing rates of interest on real estate loans. On business property I have had very few loans in recent years. On residence property the uniform rate for a number of years has been 6 per cent in addition to which the borrower paid a commission of 2 per cent and other expenses of the loan, examining and bringing down the abstract, recording, etc. Those loans generally are for three years. The value of the security is at least double the amount of the loans. Prior to that time the prevailing rate of interest was 8 per cent. That was true when I first came to Denver for all residence loans unless something very choice, when it might be had for 7 per cent. That rate prevailed until about 1896 or 1897. After which the eastern rates of 6 per cent gradually came into vogue. The prevailing rate of interest on surburban loans is 7 and 8 per cent.

Witness HARRY W. NEWCOMB.

Direct examination by Mr. Dorsey:

I reside in Denver. Am a real estate broker. Have been engaged in that business about 12 years. Am familiar with the value of lands and lots in Denver and its vicinity. Have had experience in valuing and appraising properties in Denver. Have valued Market Street property for the Burlington Railroad, gave testimony before the Broadway Extension Commission, Civic Center Commission, and the commission that had charge of the condemnation of Cherry Creek Drive. My principal business is loaning money for clients. My experience enables me to determine the value of parcels of real estate in and about Denver. Have recently inspected certain lands said to belong to the D. U. W. Co. for the purpose of valuing them. The values regarding which I am about to testify are merely land values and do not take into consideration the use to which the lands are put or the improvements thereon. The valuations upon the different parcels are as follows: Item No. 18. Littleton Mill Lands. Two parcels containing 3.51 acres have valued at $1800. The property is one of the main streets in the Town of Littleton. Item No. 21. Ashland Avenue Reservoir site, 8.37 acres at $700 an acre, $5,859. Item No. 22, Ashlannd Avenue Ave. Pumping Sta. site 11, lots at $125, $1375. Item 23 De Lappe place lots, 3 1/5 lots, $250 each $750. Item 24. Cottage Hill Tank Site, 43 lots, $150 each, $6450. In valuing Items Nos. 25, 26, 27, in the southerly part of the City and County of Denver I did not take into
354 consideration the fact that they constituted a connected contiguous and continuous, strip of ground available for right of way or other like purposes or the use to which they are put by the water company or any water company structures upon them. The basis of the valuation was the location of the ground and the surrounding land. The valuation of Item No. 25, was $53,800. Item No. 26, $11,982. Item No. 27, $209,239. The aggregate value for Items 25, 26, 27, $275,021. (The detail of the items is set forth.)

In valuing these items I did not take into consideration what it might cost to reproduce a similar strip of ground or the damages that would have to be paid to owners of adjoining land because of cutting up or otherwise damaging it by taking these strips.

Item No. 28. University Tank site 4 lots, $25 a lot $100. Item 29, South Denver Pumping Station site 14 lots, $50 a lot, $700. Item 31, Highland Park tank site 2 lots, $250 each $500. Item 32, Cottage Hill Lots, 46 lots, $150 each $6900. Item 33, 24 fractional lots, adjoining Capitol Hill Reservoir, $300 for the piece. The values that I have assigned are in my judgment the reasonable market values of those lands and lots.

Cross-examination by Mr. Nye:

The gross value assigned to items 25, 26, 27, is made up by the addition of the values I assigned to the separate parcels. If I had considered at all the fact that those items are contiguous, forming a stretch of land that might be used for a right of way, I would have

made a great deal higher valuation. If you attempted to parallel this strip of land you would have to pay many many times this amount. At least three times the amount. For illustration, we sold the Post Office site to the government and where in one case we had an option on one lot at $6000 an adjoining lot, the same kind of a lot we had options on at $25,000. You could have gone across the street and bought lots for much less. Wanting one particular parcel in one particular location we had to pay four or five times what it was worth to get it. The property could be condemned but it is pretty hard to tell where you would land then. If you paralleled this strip of land you would have to go through the Rio Grande shops and it might cost you a million dollars to go through there alone. On the other side are factories and foundries. It is a manufacturing district to a certain extent. I think to reproduce this particular tract would cost three times, yes five times the value I placed on it. Take the Civic Center for example, it cost five times what the ground is worth. My values are based upon the surrounding property. Some of this land is good for celery beds and
355 adjoins celery beds, I valued it accordingly. Some of it adjoins the Rio Grande yards and some day will be sold to the Rio Grande for yard space. I took into consideration that fact. I am not a member of the Retail Association of the Chamber of Commerce. I am not interested in the Denver Union Water Company in any way. Only I pay them pretty good water taxes which I will be glad to see reduced. I have held up about $5000 that I have refused to pay them and I am going to see how you come out before I pay them too. I told them to go ahead and turn off the water if they wanted the money. They have not turned it off on me yet and I am still carrying the money. I have no love for the water company. I estimated the land as an appraiser and an uninterested party. I think I have given the people the best end of it.

Witness WILLIAM W. WATSON.

Direct examination by Mr. Dorsey:

I reside in Denver, where I have been engaged in the Real estate business for 28 years. I am familiar with the values of lots and lands in Denver and this vicinity. My attention has been recently called to certain real estate said to be the property of the D. U. W. Co. so that I might determine the value thereof. The values are as follows. Item No. 18, page 112, Exhibit C. Littleton Mill property, 13½ acres valued at $4450. Item No. 21, page 113, Exhibit C., Ashland Avenue Reservoir site. 8.37 acres valued at $6,696. The values that I assigned are merely land values without regard to the use to which the land is put by the water company and based upon the value of adjoining and adjacent lands for general purposes. Item 22. Ashland Ave. Pump Station site. 11 lots, valued at $1650. Item 23. De Lappe place lots, 3 1/5 lots, $640. Item No. 24 Cottage Hill Tank site, 43 lots, at $175 a lot, $7,525. Items 25, 26, 27, being the West Denver Pumping Station, and Lake Archer and canal lands, shown on Exhibit A.4. colored either

red or yellow, valued without regard to the use to which the land is put or to the fact that it is a continuous strip of land and without consideration of structures of any sort whatever thereon. Item 25 valued at $53,800. Item 26, $10,780. Item 27, $194,055. Making the aggregate value of items 25, 26, 27, $258,635. land value only. Item 28, University Park Tank Site. 4 lots, $75 each $300. Item 29, South Denver Pump Station site, 14 lots, $1500. Item No. 30, office and superintendent's residence at Littleton, 20
356 lots, $3,250, without improvements. Item 31, Highland Park Tank site, 2 lots, $300 each $600. Item 32. 46 lots in Cottage Hill, $6,325. Item 33. 24 fractional lots adjoining Capitol Hill Re-ervoir $450. for the total. The values that I have assigned are the fair and reasonable values as land or lots only.

Cross-examination by Mr. Nye:

I did not take into consideration at all any value that parcels 25, 26, 27 might have as a right of way. As such it is worth at least three times as much. I think that land could be disposed of for a right of way, not right now, but I think within a reasonable length of time. A railroad right of way could be reproduced there for less cost than a water works right of way, because the railroad would increase the value of adjoining property as trackage.

I valued the same land during the appraisement of 1907-1909. I appraised this time without regard to my former appraisement. I have not compared this appraisement with my former appraisement. I am not interested in any way in the Denver Union Water Company. I was real estate manager for Mr. Cheesman, the former president of the company. Since his death I have continued to manage the real estate belonging to his estate. This connection has not in any manner biased or prejudiced my opinion in any way in this matter. I know I have given a fair and impartial valuation.

Witness LEONARD METCALF.

Direct examination by Mr. Dorsey:

I am a Civil Engineer, reside at Concord, Mass.; received my education at the Massachusetts Institute of Technology at Boston; am a member of the firm of Metcalf & Eddy, with offices in Boston. Our practice is chiefly along the lines of water works construction, the administration of some public utilities, water and electric light and power, and sanitary engineering lines and sewage disposal. Began experience in 1888 in office of Wheeler & Parks, builders and operators of water works in different parts of the country; returned to their office after graduating and remained on their construction work in different parts of the country for 3 years. Had charge of Department of Mathematics and Engineering and Meteorological Bureau at Massachusetts Agricultural College for 2 years. Began private practice in Boston in 1897 and 10 years later took into partnership Harrison P. Eddy, Worcester. Have advised a
357 number of cities and water companies in regard to construction matters and operation and designed and supervised the

construction of a great deal of work of that sort in different parts of the country. Investigated the operation of the water, sewer and street departments for the Boston Finance Commission; the Scranton and allied water companies, the Wilkesbarre and adjacent water works in Pennsylvania; have served the Indianapolis Water Co.; the New Jersey General Security Co. which supplies Paterson, Passaic, West Orange, Bloomfield, etc.; San Antonio, Texas, and a number of others,—some 75 or 100 different water works properties in different parts of the country; works in Cuba, Costa Rica and Porto Rico; have done some power work and served in litigation in the water works field both for the cities or water districts and for water companies in different parts of the country. Served on a number of Maine water district cases,—at Portland, Livermore Falls, Kittery, Rumford Falls and Waterville, Maine,—for the municipalities in those cases. Served as commissioner in one of the Massachusetts Metropolitan water diversion cases, and at Macon, Georgia.

For some 9 years had charge of the operation, rehabilitation and sale of 6 or 7 water and light plants in different parts of the country, more particularly the middle west, and operated them until I sold them for the bondholders, and had general supervision of several others for the bondholders when questions were at issue. Have investigated and determined the values of water works properties in some 35 or 40 cases in connection with condemnation or rating proceedings, or for different banking houses or prospective purchasers. The most important of these were the State of Maine cases; the plants supplying Scranton and Wilkesbarre, Penn. and environments; those of the New Jersey Security Co.; Macon, Ga.; Baltimore County, Maryland; Des Moines, Ia.; the Spring Valley Water Co., supplying San Francisco, Cal.; San Antonio, Texas; Indianapolis, Ind.; etc. Have acted both for the companies and in other cases for the cities or municipalities.

Was recently called upon to value the works of the D. U. W. Co.; first two years ago in connection with certain questions relating to the water rights of the Company and the use of Lake Cheesman, and in the fall of 1913 was recalled to Denver to assist in the preparation of data for the Board of Engineers of the Public Utilities Commission of the City of Denver, to inventory the property and determine its value for the company. This work began about October 2nd or 3rd, 1913, and barring one or two short absences, I remained here on that work until the middle of February, when I completed the investigation. I returned for this litigation three weeks ago.

358 In connection with making a complete and independent inventory and valuation of the works I inspected and investigated the condition of the property as to its efficiency, etc. The work was done in collaboration with Mr. George G. Anderson. We were assisted by Mr. William T. Barnes, my Chicago partner, who took immediate charge of the preparation of the inventory under my direction. We employed an engineering force of between 20 and 30 men for a period of about 3½ months to make the necessary surveys, examinations, drawings, tabulations, etc. incidental to the preparation of the inventory which resulted in the volume presented

in this case known as plaintiff's Exhibit C. We also prepared a large number of schedules for the engineers of the Public Utilities Commission whose investigations, embodied in their independent report, were carried on concurrently with ours, though they began 6 weeks earlier.

I prepared the table headed "Assessed value of property in Denver" at page 11 Exhibit C. Also the table "Approximate capacities of the plant of the D. U. W. Co." at page 12. It sets forth accurately the facts purported to be set forth, except one or two minor corrections, which I desire to make this morning.

I have prepared a duplicate of Exhibit C in which has been placed the valuations, figures upon depreciation, and all other matters pertaining to value which were left blank in Exhibit C originally filed with the court. This volume substituted for the original Exhibit C. Offered and admitted. The tables at page 12 of this volume concerning capacities correctly set forth the facts according to my best judgment and belief. I prepared the tables on page 13, of Exhibit C headed "Forecast of Water consumption." It is illustrated by the chart opposite page 3. With Mr. Anderson's assistance I prepared the table on page 13, headed "Safe Yield from Water sources for irrigation purposes." The tables at pages 22 and 23 dealing with seepage and evaporation from Marston Lake were prepared by me or under my supervision. They accurately set forth the facts dealt with. Plate VI a mass diagram of the natural yield of certain streams was prepared by me or under my supervision.

The last three columns of the tables dealing with the capacities of the supply mains of the D. U. W. Co. appearing at pages 41-43 of Exhibit C were computed by me, using the Hazen and Williams Formula for capacities, which is very generally used by engineers. Tables offered and admitted. I caused to be inserted the figures dealing with price and amounts in the tables at pages 99 and 100 of Exhibit C headed, "Property abandoned or no longer used in the service of the public." I caused to be prepared the tables from pages 101-104 of Exhibit C showing schedules of water rates, in effect from 1890 to 1914. The information was taken from the published
359 schedules of the water company. The tables from pages 105-107 dealing with physical and financial statistics, of the water system from 1895 to 1913 with the forecast beyond 1913 were prepared under my supervision. These tables were prepared as a result of such investigation as was necessary to disclose the information therein set forth.

The financial data in these tables does not take into consideration any allowance for depreciation. Pages 105-107 offered and admitted. Pages 100-*a* and 110-*b* cover corrections of some errors in the footings in the typewritten portion of this volume. The total correcion amounting to the sum of $4,547 which should be added to the gross reproduction cost of the property shown elsewhere. As a result of my investigation of this plant I have come to the conclusion that the plant is in excellent condition, the quantity of water available is prudently in advance of the needs of the community, the pressure under which water is furnished is good, comparing very

favorably with the records in the majority of our American cities. By this I do not mean to imply that there may not be some individual cases at the peaks of the different services where pressure is not as great as might be desired but broadly speaking it is a good one. In general I believe that the service furnished by the D. U. W. Co. compares very favorably with that furnished by any other water works system in the country. (Description of the system and method of operation, supervision of water supply from view point of health, etc.)

Their practice in the matter of supervision of water supply is good. Lake Cheesman is an unusually advantageous reservoir. The dam site being such as to give large storage for the amount of masonry and expense involved. The dam is the finest piece of masonry that I have ever seen in the world for the purpose. Marston Lake is also an advantageous reservoir in close proximity to the city. It will be used for a great many years as the principal distributing reservoir of the system. Storage is cheap and the elevation at which the water is held is advantageous. It is in no way undesirable. The use of hypochlorite as one means of purifying water is an accepted and approved method and in common use. It is used by the D. U. W. Co. in connection with the filtration system. The tables beginning at page 62 of Exhibit C headed "Summarized statement of gross reproduction cost, annual and accrued depreciation and net physical value of the property of the D. U. W. Co. estimated by Metcalf and Anderson as of Oct. 31, 1913." Show briefly all of the facts relating to reproduction cost, overhead charges, and all such items bearing upon the different elements of the plant as are necessary to be known to determine its value. The estimates upon which
360 these tables are based are set forth in greater detail later in the book. The property for convenience is divided into different classes. A and B applying to lands and water rights, and the other classes to segregations of the property by operating divisions.

Depreciation allowances are based upon the sinking fund theory with a 4 per cent rate. The accrued depreciation shown by the tables is exclusive of property abandoned or no longer in use. Interest during construction is shown on page 64 as one class. Detail- of methods of determining depreciation allowance are shown by the tables at page 65. I outlined the classifications by which the property is divided in Exhibit C using in a general way the classifications under which the company has operated. They are designated by the letters of the alphabet, Class A relating to lands and their values, beginning at page 111 of Exhibit C. The descriptions here are general descriptions by items. References are made by these descriptions to exhibits occurring at page 399-427 which give the specific description of the lands in each instance. In general the land values assumed by us are the average of the value testified to by witnesses in this case with an overhead allowance for legal and engineering expenses and contingencies of 10 per cent upon all the lands except Lake Cheesman. In the cases of lands used for specific water works purposes we have valued them for those purposes according to our judgment using the valuations of the witnesses as a basis.

Exhibit A8 shows the land values outside the city. The items correspond with similar items in Exhibit C except that it separates the lands outside the city from those within the city. Offered and admitted. Exhibit A9 shows the values placed upon the land within the city by Messrs. Newcomb, Conaway and Watson, the averages of the three and the value accepted by us for these lands. Offered and admitted. The addition of ten per cent for legal, engineering and contingent expenses is a proper allowance because a corporation such as this always does suffer such expense in gathering and assembling such property. The total valuation placed upon Lake Cheesman is about $3,400,000 including lands, structures, and all overhead charges. Valuation allowed for the lands was $200,000. In a general way this allowance is equivalent to $200 an acre upon the lands submerged and a nominal allowance approximating the cost of the lands outside of the water surface. It makes little difference what exact value may be placed upon the lands because the total value is in the entity and if land values were reduced, water right values would be increased. In the case of the Marston Lake Reservoir site we assigned a value of $168,000 as against a land value testified to by Messrs. Wall and Bowles of $71,780. Their valuation gave no con-
361 sideration to the value or use as a reservoir or the difficulty of assembling land for such purpose. The allowance is approximately $200 an acre. The same conditions prevail here as at Lake Cheesman. The total value is in the entity. A decrease in the allowance for land would result in an increase in the allowance for water rights. So the total value would amount to the same sum. It is common experience in assembling a body of land for such purposes that the cost is certainty two to three times as much as the land only in separate parcels. The element of damage is certainly an element of cost. Of the city lands, Items 25, 26, 27, are the same parcels shown on exhibit A4. To these lands we assigned a value of $271,094 which is lower than some of the values testified to by witnesses. It seemed to us for the purpose of a rating base, fairer to assign this value considering the uses to which they are put than the larger value which they might possess for some other use.

These lands are actually worth in the plant considering the service they perform the price that we have placed upon them. As to Class B water rights, the valuations are primarily the work of Mr. Anderson. I have gone over the matter sufficiently to determine that the values are reasonable. Therefore, they are included in our joint report. Fundamentally they are based upon the value of water in this vicinity for irrigation purposes. I consider that they are worth more for domestic than for irrigation purposes. Class T at pages 391-395 of Exhibit C and supported by an inventory beginning at page 821, covers the materials, furniture, tools, etc., used in connection with the system. The valuations assigned to the several items represent the judgment of Mr. Anderson and myself upon this class of property. Classes C to S cover the various structures and the details asset forth in the tables of summaries and at pages 119 to 390 of Exhibit C are correct statements of the determinations of Mr. Anderson and myself as to the extent and value of the several items.

In connection with these structures we have allowed in the gross reproduction cost 12½ per cent for engineering and contingencies, based on experience and judgment that the allowance is a reasonable one. Such expenses are incurred. These are matters of judgment and experience. After determning the gross reproduction cost, the next step is to determine the depreciation which the various elements of the property have suffered. We did that, taking into consideration both the physical depreciation or wear and tear of structures, and the functional depreciation, obsolescence, etc., which result in the abandonment or displacement of structures, for such reasons as changes in the art or changes in the conditions under which the company operated. In the final analysis I think the determination of depreciation is a matter of judgment which may be
362 checked as an aid to judgment by applying the sinking fund method of computation to the life assigned. In using the sinking fund method here I have used the 4 per cent basis which I consider conservative. We also have used in our determination the total cost of the item without consideration of the scrap value that might inhere in it, tending also to conservation. Based upon this assumed annual allowance the determination of accrued depreciation is a mere matter of computation to determine the amount that he accrued within the age of the different elements of property. The fair allowance for depreciation as I figure it in this case is $138,000 a year for physical and functional depreciation, and $30,000 a year for contingent depreciation. Making a total allowance of $168,000 a year. Exhibit A10 a series of blue prints, pages 62-97 contains a tabulation, of depreciation allowances based upon the present net reproduction cost of this property. The final result is identical with the results shown by Exhibit C but the method is different.

Annual depreciation allowance will generally lie at from 8 to 10 per cent of the gross revenue of the property. The accrued depreciation to date on the property now in use is found to be about $1,500,000. In addition to this there has been abandoned, property to the amount of approximately $1,250,000. So that the total depreciation, which this property has suffered up to the present time is estimated, at approximately 2¾ millions of dollars. I think the depreciation allowance made by me is at least enough. I may have deducted more than enough. For the next five to seven years I should consider ten per cent of the gross revenues of this plant a fair allowance for ordinary depreciation and an additional allowance of $30,000 a year, for contingent depreciation. In arriving at the reproduction cost of this system we have attempted to follow what the Wisconsin Railway Commission has defined as normal prices, such as might be obtained under fair competitive conditions were the work done under contract. In such items as cast iron pipe on which the market fluctuates more or less violently we have taken the average prices for the last ten years. As to the cost of doing the work we have interviewed contractors, examined contract figures and given consideration to the cost of work done by this company in the past five years. Exhibit A10 offered and admitted. The unit cost assumed for cast iron pipe was $32 a ton f. o. b. cars Denver. In the

distribution pipe system we added a $1.25 per ton as the cost of hauling, which brought it to $33.25 at the trench. In my judgment that is a fair allowance for the cost of handling. The entire determination at which we arrived was the reproduction cost
363 of the identical works less depreciation. Exhibit A11 contains the essential consideration upon which we based the unit cost for cast iron pipe. Offered and admitted. Exhibit A12 shows in detail the cost of pipe laying work done by this company during the past five years, the location and extent of the work, with brief notes concerning the character of soil, etc., exclusive of overhead charges, such as engineering, supervision, and inspection. This work generally has been done in the outlying districts of the city. These costs were one of the considerations that aided us in arriving at final judgment as to unit cost to be applied to the distribution pipe system. In the estimate of cost of the distribution system we included the cost of cutting, removing and replacing, existing pavement. Exhibit A13 is a summarized statement of the cost of pavement work according to the various classes of pavement. Exhibit A13 offered and admitted. Exhibit A14 gives the estimated cost per foot of trench for the pavement work over pipes of various diameter. They are the unit costs which we used in determining the reproduction cost of the system. They were arrived at partly on information furnished by Mr. Hunter, City Engineer, and officers of other public service corporations, to which we applied our judgment, arriving at these figures. Exhibit A15 shows the bases used by us for estimating the reproduction cost of laying cast iron pipe in Denver, the weight of pipe, assumed trench width, cost of all items connected with pipe laying, total cost of laying, with an estimate of additional cost to cover difficult work. It is prepared in such form as to be readily compared with similar data offered by the Board of Engineers of the Public Utilities Commission. Exhibit A14 and A15 offered and admitted. Specials are the fittings used in connecting and putting the pipe together.

The allowance for pavement in determining reproduction cost was based on theory that to reproduce the present system it would be necessary to cut the pavement wherever pipes occur. We also made extra allowance for the expense of crossings under streams, ditches, railroad and street railroad tracks and crossings. The net reproduction cost of these three items, pavements, parking, and special crossings, amounts to $656,205. Anyone attempting to reproduce this plant would encounter those obstacles and have to pay the cost of meeting them. It is my understanding that the reproduction cost theory involves the reproduction of the identical plant. That is what we did in this instance. We allowed in connection with the distribution pipe system a valuation for the service connections. Page 64, Exhibit C. By service connection we mean the tap in the main and the corporation cock controlling it, which has become a part of the pipe system and cannot be removed because it
364 would not be possible to control the water without it. The gross allowance for this item was $140,038. Exhibit A16 is a memorandum of the cost of wood stave pipe material for a

period of years, upon which we based our unit prices. We assumed on the lumber the price of $37 per thousand feet delivered, on the bands, and clips, 2.6¢ per pound f. o. b. cars, and on shoes, 3.9¢ per pound, f. o. b. cars. These prices were based on the average cost over a period of years.

It affords a greater stability to take the fair normal prices for a period of years, than to value a plant year by year on the prices then prevailing. Exhibit A16 offered and admitted Exhibit A17 gives data concerning the banding of wood stave pipe. At the bottom in tabular form are the costs assumed by us. Exhibit A17 offered and admitted. Exhibit A18 shows in graphic form the cost per linear foot of wood stave pipe as estimated by us, it excludes the cost of special structures, such as bridges, culverts, extra concrete at bends, etc., which in general increase the cost shown about one-third. It also gives a comparison with the costs arrived at by engineers' of the public utilities commission, being 8 per cent greater than their cost on gross reproduction and less than 5 per cent greater than their cost on net reproduction. Those figures were made independently neither set of engineers knowing where the other was going to land.

The gross reproduction cost excluding interest during construction on the structures, Classes C to S determined by us was $10,589,683. to that we added interest during construction, $964,293. which is 8 per cent of the gross reproduction cost of the items cited plus the land and supplies. Interest during construction represents the charge upon the money borrowed for the creation of such a plant as this for such period as the money would be tied up in structure under way until the structure actually went into use. It is an actual cost to which one undertaking such construction is put. The item of $120,000 occur-ing on page 64 Exhibit C designated "Organization and preliminary expense" is assumed to cover the expenses of preliminary investigation, legal work, filings, etc., incurred incidental to an investigation of the project and organization of the corporation.

That amount was added to the gross reproduction cost. As shown at page 64, Exhibit C there was also added to the gross reproduction cost of the structures lands to the amount of $920,103. Also Class T stock and supplies valued at $247,883. making a total gross reproduction cost for physical structures plus interest during construction, preliminary expenses, lands, and stock and supplies, of $12,841,-962. To which is added Class B Water rights, $3,530,000 365 making another total of $16,371,962. Finally there is added as shown on page 64 Exhibit C as going concern value $1,200,-000. That is the value present in a plant that is operating with attached business and an established income, over and above the value in an exactly similar plant in exactly similar physical condition not operating and with no business attached.

Exhibit A19 consisting of 11 pages, shows various computations. of the element of going value. The first computation is on the basis of the assumption by the Public Utilities Commission Engineers corrected to follow the Wisconsin Railway Commission theory which

produces a value of $1,710,000. The second method is substantially identical with the first except for some revision in the revenue and operating expenses as shown in detail by table 2, and results in a value of $1,920,418. The third computation is on the basis assumed by the Public Utilities Engineers corrected to follow the Wisconsin Railway Commission theory including in the base, new construction from earnings reported by the company since 1895, and results in a value of $5,778,000. The fourth computation is exactly similar except a 6 per cent rate of return is assumed instead of 7 per cent. which results in a value of $1,721,000. The Public Utilities Commission Engineers assumed a rate of return of 7 per cent and 1 per cent for depreciation. Objection to inquiry as to amount of development expense allowed by Public Utilities Commission Engineers overruled. Exception. The allowance by the board of engineers of the Public Utilities commission for development expense was $375,628.

The second page of Exhibit A19 shows in diagramatic form the forecast of the revenues and operating expenses of the existing plant, estimated for a period of five years from Oct 31, 1913, to Oct. 31, 1918 compared with a theoretical plant, the construction of which was commenced on that date for the purpose of showing graphically the time that would be required for the theoretical plant to develop the same revenue as the existing plant. Operating expenses are similarly shown.

These diagrams illustrate the meaning of going concern value in the existing plant. To test these figures they have been reproduced in tabular form at pages 105-106-107 of exhibit C where tables show the actual gross revenue per capita for the years 1905 to 1913, gross operating expenses per capita exclusive of fixed charges and depreciation upon the existing plant for the years 1905-1913, and the actual net revenue per capita for the same period. The figures carried forward in the diagram are based upon these tabulations. Columns 2-6 on page 5 deal with the financial statistics of the existing plant for the assumed period required for the development of
business and construction of the new plant, such as revenue,
366 operating expenses, taxes depreciation, and net revenue.
Columns 7-11 contain similar data relating to the theoretical plant. Column 12, shows the excess of the net revenue of the existing plant over the net revenue of the theoretical plant under the leaflet rates. Having in mind this comparison we assume that the investor builder who has an option at the date of valuation to either buy the existing plant or construct a new one, has in hand a sum of $15,850,000 which would cover the physical property, including water rights, interest during construction and the going concern value. If he buys the existing plant he immediately derives the revenue established and has to meet operating expenses, fixed charges and depreciation. If he builds a new plant he begins to make his plans, then spends his money in the building of the plant and the development of business. At the end of five years it is assumed the structural plant is complete. It is further assumed that it began to earn revenue in the second year after construction commenced.

The revenue of this plant overtakes the revenue of the other plant at the end of an 8 year period or 1921. Allowance is also made for the earnings upon his construction funds which must be kept in liquid form until construction is complete. The total structural cost is not complete until the year 1918. The total interest so earned upon the unemployed capital is shown in column 9. Interest during construction is allowed for the new plant which is shown in Column 10. This allowance tends to reduce the going concern value. In Column 12 is shown the preliminary excess net revenues of the existing plant over the new plant, the final excess revenues of the existing plant over the new plant are shown in column 13.

From these bases is obtained the present worth factor. In the next column is found the amount obtained by applying the factor to Column 13. The last column shows the cumulative amount to be $978,000. I estimate therefore that under the assumed conditions of acquisition of income indicated by the diagram and these tables that the going value would be approximately $980,000. In paragraph 6, page 1, of Exhibit A19 I have assumed a revenue to be made up of existing operating expenses, the same allowance for depreciation and a 6 per cent return upon an assumed value of the property of $15,500,000, instead of the actual rate of return enjoyed by this property. This is equivalent to an increase in the return for the year 1913 of $152,000, and results in a going concern value of $1,630,000. If seven per cent is assumed to be the fair rate of return upon the fair value of the property of $15,500,000 then the going concern value based in other respects upon the same figures shown in the tabulation would be $2,080,000. Within my experience going concern or development expense allowances
367 have run on the larger plants from 10 to 15 per cent of gross reproduction cost and upon smaller plants somewhat more. I do not remember ever getting a result less than 10 per cent and I have gotten results and seen other engineers get them as high as 20 per cent.

Taking 10 per cent of the net reproduction cost upon this property would give us $1,600,000 and upon the gross reproduction cost approximately $1,700,000. In paragraph 9 of Exhibit A19 is shown the going concern value upon the assumption that it was equal to one year's gross revenue. In other words, $1,386,000, under the leaflet schedule. In general, within my experience, the going concern value has been found to lie between 1 and 1¾ times the gross annual revenue of the property. The larger amount generally being found in plants requiring a long period of construction and in which the rate of acquisition of the business for one reason or another, such as a bountiful supply of ground water, would be likely to be long. As a result of these studies in this region where I believe the rate of acquisition of the business would be more rapid than normally found in this country, I have assumed the going value of this property to be $1,200,000. I believe that the actual development expense in this plant has been substantially more than that. I have now referred to all of the tables contained in Exhibit A19 except sheet seven, which refers to interest during construction.

In columns 1-10 of that sheet are references to the different classes of property included in the plant, with the years in which it is assumed the construction expenses will be incurred, worked out on the basis calculated to produce the most economical ultimate result. Column 11 shows the rate at which the investment is assumed to be made. Column 12 the amount to date. Column 13 the average amount upon which interest during construction is chargeable for one full year, and in column 14 the amount of this interest as figured at the rate of 7 per cent per annum. The total interest charge is equivalent to 7.93 per cent of the construction cost. I therefore have assumed 8 per cent as a fair allowance for interest during construction upon the entire cost of reproduction of the structures, lands, and water rights of the property. In columns 16 and 17 are shown the revised net construction cost assumed, including the interest during construction item, and based upon this assumption of an 8 per cent interest during construction allowance. This is the basis upon which I arrived at the rate for interest during construction on the reproduction cost of this property.

I have applied this average factor 8 per cent to the entire property because it is easier in computation. The rate is low
368 on such items as must be acquired at the beginning of construction and high on such items as do not tie up capital for a considerable length of time. For instance, in the acquisition of land by the Massachusetts Metropolitan Water Board the interest during construction item amounted to nearly 30 per cent of the cost of acquisition of those lands. The application of the average factor produces exactly the same result as the application of the actual rate to each class. The net construction cost items on sheet 7 exhibit A19 do not correspond with the final figures on this plant because the computation was made in advance of completion of the other report. It is close enough so that it has not appeared necessary to recompute them as the final results would not be affected. I believe that in computing the going concern value on the basis of the acquisition of income by a theoretical plant I have assumed a more rapid acquisition of revenue than could actually be realized in practice. That would tend to reduce the going concern value. As a result of all of these investigations and computations it is my judgment that the going concern value of this plant is $1,200,000. The other figures are merely made from various view points with the idea of trying at final results from a consideration of all of them. Exhibit A19 offered and admitted. The difference between my first computation of development expense on page 6 Exhibit A19 and the computation of the Public Utilities Commission Engineers develops from the fact, that I carried forward the deficits and surpluses after the manner used by the Wisconsin Railway Commission, the return being figured upon the capital sum thus adduced, the surpluses themselves enjoying annual accretions the deficits being added to capital account and the surpluses subtracted. This was not done by the Public Utilities Engineers. In computation No. 3. I followed the same method except that I added to capital account additional construction made with funds realized other

wise than by the sale of bonds. That is the method employed by the Wisconsin Commission. That was not done by the Public Utilities Commission Engineers. The term weighted age used in connection with depreciation at page 66 of Exhibit C and elsewhere means practically the average age of items in the plant similar in character that are being constructed continuously from year to year during the life of the plant, such as distribution pipe. The same methods were used in arriving at unit costs of all parts of the plant as have been explained with reference to the distribution pipe system and the conduit system. After ascertaining the unit prices to be applied the quantities were ascertained from measurements, checked against the records of the company and our assumptions as
369 to reasonable width, depth, etc., in the case of trenches and like work. I have given consideration to the operating expenses of the D. U. W. Co. Exhibit A20 shows the revenue and operating expenses of the company from 1895 to 1913. I believe that a fair amount to be expended by this company for operating expenses, including taxes, but excluding depreciation, for the year 1914, is $500,000. approximately $380,000, exclusive of taxes. For the year 1915 I assume that it will be about $50,000 less because I assume that there will be no such expenses as there have been this year in connection with the investigation of the Public Utilities engineers and the rating case. In my judgment those estimates are reasonable allowances for the operation of this plant. The estimates for the future are on the theory that the company will not have any more special litigation. Exhibit A20 offered and admitted as the basis for Mr. Metcalf's testimony subject to proof by an accounting officer of the company.

We made no allowance in the case of the Lake Cheesman land for engineering, legal expenses or contingencies, but allowed interest during construction to the amount of $16,000. That was at the average rate of 8 per cent adopted as the interest during construction factor on the entire plant. Considered by itself it was not sufficient to cover the interest during construction on that item. The abandoned property listed in Exhibit C. was not considered in either the gross or net reproduction cost. The only consideration given it was in connection with the matter of depreciation on the entire plant and it was independent of and in addition to the depreciation allowance on the existing plant. Its consideration simply gives a more accurate check upon the fairness of our depreciation allowance. The gross reproduction cost found by Mr. Anderson and myself was $17,571,962. the accrued depreciation $1,533,583 and the reproduction cost less depreciation $16,038,379. to which should be added the correction item of approximately $4500 shown on pages 110-a and 110-b. On page 64 of Exhibit C. occurs a note referring to certain water rights in the Bergen Ditch and Reservoir Company, The Harriman Reservoir and the High Line Ditch, which were excluded as not essential to the operation of the plant. They are strictly irrigation rights. The determination of value set forth on page 64 of Exhibit C. relates to Oct. 31, 1913. To bring it down to date we should add construction items since that date and deduct depreciation which has

occurred in the interval. The net difference would result in a deduction of from $50,000 to $55,000 bringing the net reproduction cost to date to a little less than $16,000,000. Considering every element affecting its value, such as its condition, its operating efficiency, and the service which it is performing and is capable of performing, it is my judgment that the fair value of this property for a rating base is $16,000,000. There are a few small parcels of real estate which are not directly necessary to the property except in so far as the maintenance of water rights is concerned. But the amounts involved are so small that it is my judgment that the sum of $16,000,000 may be taken as the fair rating base or the fair value of the property at this date. The engineers of the Public Utilities Commission concluded that the value of the property as of Oct. 31, 1913 exclusive of going concern value, water rights, and rights of carriage of water, was $10,044,778.31. The difference between our conclusions lies chiefly in the inclusion by us of the value of water rights, going concern value, certain property that was excluded by the board of engineers and in a somewhat greater estimate of reproduction cost on certain of the structures of the company.

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Exhibit A. 21. is a summarized statement of the findings of the Public Utilities Commission engineers of the gross reproduction cost, assumed depreciation, and net physical value of the properties referred to, excluding water rights, going value and the right of water carriage, prepared by me from an analysis and study of their report. Exhibit A. 21 offered and admitted over objection by counsel for defense. The Master reserving the right to rule finally as to whether the report of the Utilities engineers is an admission against interest, binding the defendants, until such time as the evidence is all in.

Exhibit A. 22. is a comparison of the valuation of Metcalf and Anderson and of the engineers of the Utilities Commission upon the property of the D. U. W. Co. offered and admitted under the same conditions as Exhibit A. 21. Exhibit A. 23 is a similar comparison to exhibit A. 22 in greater detail. Exhibit A. 23 offered and admitted subject to the same objection and conditions as Exhibits A. 21 and A. 22. The note at the bottom of the Exhibit A. 23 calls attention to my belief that the engineers of the Utilities Commission deducted the valuation of the Harriman Reservoir twice.

Exhibit A. 24 is a summary of valuations upon the property of the D. U. W. Co. by the members of the former Board of Appraisers, Messrs. Freeman, Holman and Hazen, as of May 1, 1914, Metcalf and Anderson Oct. 31, 1913, and the Public Utilities Commission Engineer- as of Oct. 31, 1913. Also a statement of the securities outstanding and estimate of working capital necessary for the operation of the plant. Exhibit A. 24 offered and admitted subject to the same objection and conditions as the three previous exhibits. In item 8 Exhibit A. 24 referring to valuation by Public Utilities engineers is a note "partial valuation." I mean by that that there was excluded from their valuation, going concern value and water rights. Exhibit A. 25 is a concise summarized statement of the revenue and operating expenses of the D. U. W. Co. for the year 1913-1914 under the leaflet schedule and a computation to show

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the results under the 20 per cent reduction provided by the rate fixing ordinance. On the basis of actual operating expenses with an allowance of $138,000 for depreciation and $30,000 for contingent reserve the rate of return under the ordinance rates would have been approximately 2.9 per cent on the valuation of $16,000,000. Also computations showing what the gross revenue would have to be in order to produce returns of 6, 7 and 8 per cent on a value of $16,-000,000. In order to give a rate of 6 per cent the gross revenue must be $1,634,000. 7 per cent, $1,794,000. 8 per cent $1,954,-000. or expressed in per cent rate of return upon net reproduction cost, 10 per cent, 11 2/10 per cent and 12 2/10 per cent respectively.

The significance of ascertaining the percentage of gross revenue to reproduction cost is merely as an aid to judgment. Within my experience the percentage of such gross revenue upon net reproduction cost for such property as this has run from 10 to 12 per cent. In my judgment the present gross revenue of the plant is too low.

Exhibit A. 25 offered and admitted. over objections by defendants counsel. Exceptions. Exhibit A. 26 gives in greater detail a comparison between the valuations by the Board of Appraisal, Messrs. Freeman, Holman, and Hazen, The Utilities Commission Engineers, and by Mr. Anderson and myself, referred to in summarized form in exhibit A. 24. Offered and admitted subject to the same objection and conditions as Exhibit A. 24.

Senator Patterson attempts to introduce the report by Engineers Phillips and Fellows made in 1910 on the value of the Water system of the D. U. W. Co. alleging that it is the report required by the charter amendment, therefore the report of the Utilities Engineers has no standing. The pamphlet was circulated during the bond issue campaign in 1910. Pages 62-64, pages 65-97, pages 105-107, pages 109-395, and exhibits, commencing on page 399 to the end of exhibit C, offered in evidence and admitted over objection of counsel for defense. Also pages 110-a and 110-b.

Cross-examination by Mr. Nye:

My first acquaintance with the property of the D. U. W. Co. began about Sept. 1, 1912. That was in connection with the adjudication proceedings for the water rights of lake Cheesman, in which I gave testimony relating to whether the use of lake Cheesman was a
372 necessary and beneficial use. I then examined the greater part of the property. My testimony then was based on the theory of the use of that water supply for the city of Denver so long at least as the city desired to use it for such purposes. I think it was recognized that the waters of the lake could be put to other uses, although I think that the direct question was whether the lake as now used in the service of the city was a beneficial use. My first connection with the valuation of the property began early in Oct. 1913. The inventory and valuation contained in Exhibit C. was for a dual purpose. We were first asked to assist in the preparation of such data as might be called for by the Public Utilities Engineers and second to supply a complete inventory and valuation for the benefit of the company for use in any possible negotiations with the city in

the future. The valuation then was considered more for the purpose of a possible sale to the city than for rating purposes.

There were no rating proceedings before the company at that time. I really do not know when the rating question first arose. Except for about four weeks I was in Denver constantly between the 1st of Oct. and the middle of February. I was not here when the rate ordinance was passed. There was some discussion in the press of the possibility of action by the council in reducing rates before my departure. In making an inventory of this sort we always aim to make it so that it may be used either for the purpose of rating or sale. I have participated in probably 5 or 6 rate making valuations and have participated in considerably more valuations for purchase purposes. There may be a substantial difference between purchase purposes and rate making purposes but not of necessity.

As I understand the law, in valuing for rate making purposes it contemplates a fair return upon the fair value of the property which may or may not be synonymous with investment. The Wisconsin Railway Commission recognizes that there may be a difference between value for purchase purposes and value for rate making purposes and in some cases has taken that into consideration. I recognize the rulings of that commission as one of the authorities. It is one of the ablest of our commissions. I do not think the California Commission is recognized to the same extent as the Wisconsin Commission. The New York Commission has had very little to do with water rates. In using Exhibit C. and the values there contained in this case we considered whether the properties valued were reasonably necessary to the operation of this plant for the furnishing of water to the city of Denver. The conclusion from this consideration differed very slightly from our conclusion for purchase, because
373 the amount of property that is not of immediate use in the service of the public is trifling.

To all intents and purposes the value for rating is the same as the value for purchase. The filtered water storage capacity of the system which is virtually the capacity of the distribution reservoirs within the city is 87,000,000 gallons. The average daily capacity of the filters and infiltration system is practically 68,000,000.

If the distributing reservoirs were full there would be approximately 87,000,000 gallons of storage in the city and the average daily supply available from the filters independent of the stored water would be 68,000,000. This average daily supply could be increased materially by operating certain portions of the plant at a higher rate than the average rate. Also, by drawing down the water level in the reservoirs. By drawing down the water levels substantially the water available throughout the conduits could be substantially increased, because they would be delivering their supply against a lower pressure. The question of the level at which water is distributed is controlled by the elevation of the water in the reservoir. Eliminating the supply from the three infiltration galleries, the supply from the sand filters and the mechanical filters can be increased above the present average. More water has been filtered through these filters for considerable periods of time than is shown by the

normal rated capacities without decreasing the efficiency. The sand filters cannot be forced to the same extent as the mechanical filters. The term approximate capacities used in connection with the tables of capacities in Exhibit C, is a general one and does not mean that the capacities cannot be accurately determined. The capacity of the filters is simply a question of the rate at which you run. The rate may be forced or may be decreased.

The average capacity of the Mississippi Street galleries is 7.3 million gallons daily but they have frequently supplied 13 million gallons daily. The water flows from the galleries by gravity and the flow is controlled by a valve on the pipe. By increasing the flow from the pipe the draft upon the galleries is increased. If less than the normal yield of the galleries is being drawn the water table automatically rises, if more than the normal yield of the gallery is being drawn the water table automatically lowers. I should estimate that the safe daily yield from the Mississippi Street galleries is probably 10 million gallons.

The tables at pages 34-35 Exhibit C. indicate that at times the draft on the Mississippi Street galleries has exceeded 13 million gallons. For the years 1900 to 1913 the average daily draft
374 from the Mississippi Street galleries is 5¾ million gallons. From Cherry Creek for the same period omitting the years 1906-7 when the conduit was out of service the average daily draft was 2½ million gallons, and for the same period the average daily draft from the Platte canon galleries is 6.2 million gallons. In my estimate forecasting water consumption I assume a considerable increase in the consumption in the next five years due to the increase in population. The water supply is available but the company lacks conduit capacity to take care of the maximum conditions which will then occur. This applies to the clear water conduits, the raw water conduits are of sufficient capacity to materially increase the supply if means are provided to take the filtered water away from the plant. As a guess I should say this maximum demand may require an increase of 25 per cent in the clear water conduit capacity. The infiltration galleries, except the Mississippi street galleries are now operated up to their normal capacity. In the Mississippi Street galleries there is a margin of 4 or 5 million gallons a day.

Our net reproduction cost of conduit No. 6 exclusive of lands and rights of way and exclusive of No. 6 extension was approximately $353,000. The extension runs from Wynetka to the Marston Lake Reservoir. The capacity of the conduit is approximately 23,000,000 gallons. If the 48 inch branch of the 60 inch conduit is shut off the 36 inch branch will carry a greater proportion of the supply from the 60 inch line than it will with the 48 inch line open. The 36 inch branch of the 60 inch conduit to the Platte Canon Reservoir has a greater carrying capacity than the 48 inch branch to Marston Lake because of the difference in the length of the lines and the frictional loss.

The total value of the abandoned property of the system is approximately $1,261,000. Information as to the length and size of wood and cast iron pipe abandoned was obtained partly from com-

pany records and partly from employees. The weights applied to the cast iron pipe are the same weights that were used in our reproduction cost estimates. We took into consideration that in the early stages of the existence of these works some of the pipes were, I believe, of lighter weight than class B. and we made an effort to estimate the average weight of the system as a whole. I am not clear in my recollection as to whether that was pipe laid by the Citizens Water Company or some other company.

I am not able to say what portion of the lighter weight pipe put in by any of the companies is included in the abandoned property.

We included the Sullivan Reservoir in our total valuation.
375 The net value allowed was $132,000. If it is classed as abandoned property it would increase the abandoned property estimate $1,261,000, by the amount of its gross reproduction cost, something like $190,000. Sullivan reservoir has never been used or connected with the system. Water from the Cherry Creek galleries could not be used through Sullivan Reservoir except by pumping. It could not be supplied from either Platte Canon or Marston Lake without pumping. I do not know what office the reservoir was originally designed to perform. It could be utilized as a high service distribution reservoir by pumping water to it from the University Park Station or any convenient point where coal could be obtained on the railroad sidetrack. I understand it was constructed prior to the organization of this company.

It seems to me that it is fair to include it in the valuation for rating purposes at this time, because the company has actually under contemplation plans for its use, which would be advantageous. The column marked "pressure range and pounds" at page 105 of Exhibit C is not filled out simply because there were so many different systems in use here that it could not be well put in so small a space in an intelligible manner. The quotations from the Underwriters report and the accompanying tabulations and diagrams take the place of that item. Neither Mr. Anderson nor myself made tests of the pressure as the Underwriters did, but we made a study of existing records and results obtained.

Bonds of the D. U. W. Co. to the amount of $8,000,000 are outstanding and bonds of the S. P. C. & R. Co. to the amount of $4,000,000. It is my impression that $880,000 of the bonds of the S. P. C. & R. Co. are owned by the D. U. W. Co. I took into consideration in determining the value of the property, its outstanding securities. I did not consider their market value because it seems to me to be without significance under the conditions here existing, which I certainly consider abnormal. I considered the income of the company from making new taps as an item of revenue. In its bookkeeping the company handles it as an offset to operating expenses. I included in the value of the property a valuation for the service connections though I knew that they were paid for by the consumers. I regarded the taps in the nature of a betterment which could not be removed from the system. I have also given the city credit in the consideration of revenue for the profit derived from their construction. Also, the charge made for them may well be considered in the nature of a license charge to the house owner for

the privilege of connecting with the mains. Part of the value assigned is a value because of the fact that the connection is
376 there and through it the company is enabled to deliver water and to earn a return.

It is true that the net reproduction cost allowed for the connections is considerably greater than the profit derived by the company from making them. As I see it this value is not a value which should be included in the going concern value. I do not believe that I have duplicated it by allowing for it in both reproduction cost and going concern value. It is not in the going concern value. I have not included in the valuation the service pipes attached to the tap. Have not been able to ascertain accurately what amount of class A pipe laid in the system but on the assumption that all of the Citizens Pipe now remaining in service was of that class it would not make a difference of more than $10,000 in the value of the system.

I think we took that into consideration and made liberal allowance for it by eliminating the excess weight allowance always provided for in the specifications for pipe contracts. The existence of class A pipe would not affect the pressures, on the system within the limits of pressure that exist in this city. I have found no evidence to lead me to believe that electrolytic action would have any affect upon the lighter weight pipes. I think the precautions taken by the company to protect its pipes against electrolytic action are reasonable and proper. I made no examination to determine the condition of the pipe because that is practically impossible, but I did discuss the matter with Mr. Thomas and the foreman. The pipes were bonded to the rails some seven or eight years ago. But even before the bonding the electrolytic action was limited chiefly to certain service pipes in proximity to the power stations.

No doubt it has been known to the designer of the pipe system that the city maintained a fire engine service for the extinguishment of fires and that as well as financial consideration had a bearing upon the size of pipe adopted for different streets. It is clear that if the service will not produce a reasonable return on a large pipe and reasonably adequate service can be furnished through a smaller pipe, that the smaller pipe will be laid. The water company would have no objection to laying larger pipes than it does provided a return commensurate with the increased cost of construction could be earned. In making that statement I have in mind the number of consumers on a particular piece of pipe and the return enjoyed from hydrant rental, rather than the rate which any particular consumer would pay.

I think that water works construction always contemplates the use of pressure from the system for fighting fires and many
377 fires are put out without the use of the steamer. The situation here is such that a system entirely a gravity system with an adequate pressure for fire protection could be installed but at increased cost. I doubt if it would be financially worth the price. The water from the Mississippi street galleries is slightly harder than the other water. But mixing that as they do with the other water it does not seem to me that it is a matter of serious import. If a condition arose that might make it advisable to discontinue the

Mississippi Street supply, the deficiency in supply thus created could be made up from Platte Canon or Marston Lake by an increase in filter and clear water conduit construction.

Hypochlorite is simply inimical to bacterial life. Its function is entirely different than alum, which is a coagulant. You could not raise the efficiency of the mechanical filters substantially by the use of additional sedimentation before application to the filter plant. You might increase the capacity slightly but not materially. I stated that there undoubtedly were some instances where at or near the top of some of the services the water pressure was not all that could be desired. This condition is worse during the hours of irrigation. It is my judgment that the use of meters would be the most effective remedy. There are meters of modern construction which are efficient and comparatively cheap to install. I stated that the general condition of the pipes, conduits, reservoirs and storage basins was excellent. We made some examinations of the wood pipe conduits, by excavation and inspection of the external conditions and the internal conditions where we were able to see the pipe. I was not here when the conduits were broken by the floods. I arrived here just after, went up to see the openings and saw some of the staves that were taken out, those I saw were in very fair condition. The conduits were covered with water so I was unable to make any extended investigation of them. The excavations that we made by the inspection of the conduits were the same as those made under the direction of the Public Utilities Commission engineers. I did not personally see all of them. Some were seen by Mr. Barnes, some by Mr. Anderson. Mr. Skouland reported to me on some of them and Mr. Thomas told me more or less about them. I also saw several of the pipes on the occasion of my previous visit and I have seen two or three openings since I came back. I also know the delivery capacity and have had conferences with Mr. Hazen and others in regard to what they observed when they were here. There are a few points on the system at which the pipe has not at all times run full most of which have been replaced by pipe of cast iron or other material. The capacity of the Mississippi street conduit is
378 about 13 million gallons daily. The fact that it is normally operated at about 6 or 7 million gallons does not mean that the pipe is not running full.

It is my impression that the pipe is controlled at the lower end so that it would be full regardless of the quantity carried unless it drew the ground water level down below the top of the pipe. In valuing the Archer Lake lands we took the value arrived at by the real estate experts and not the right of way value fixed by the railroad man. In finding the value of the lands we excluded from them the value of the water rights simply as a method of finding the combined value. We treated the water rights separately from the lands. I think that is common practice with most engineers in such work. We are facing the same situation of combined land and water values in San Francisco. Mr. Anderson and I are working together there and working on the same basis as here. I don't know that I can cite specific instances but there is no question in my mind but water and land values are generally segregated by engineers. In water

power diversion cases it has been very common practice in the East to separate the two. There have been very few rating cases in water works litigation up to date. There have been many condemnation cases but very few rating. I think the San Joaquin valley case recently decided by the United States Supreme court and the San Diego case are cases where land and water values were segregated. Some of those cases have been decided since we made this finding. I do not think the method was either mine or Mr. Anderson's or a composite. I think it has been used for many years and there is nothing novel about it. Drawing the full capacity of the Mississippi Street conduit would not necessarily mean that the water level would be lowered below the top of the pipe. Of course, that would depend upon the height at which the water table would stand, but it is my impression that the gallery is low enough so that would not occur. I would be glad to ascertain for you if you wish me to do so. The greatest life may be expected of these wood pipes where the interior of the pipe is constantly in contact with the water surface. Rotting occurs where it is alternately exposed and covered with water. Soil conditions also affect the life of the pipe. I could not say which would be the most effected the pipe or the bands. One stave in the periphery of the pipe might give way and be replaced without necessitating replacement of the rest of the pipe or of the bands. Though if some of the bands were badly pitted they would be replaced.

I testified that we allowed a valuation of $200,000 for the Lake Cheesman land which would be equivalent to a valuation of $200 an acre for the submerged land and to approximately the
379 cost of the lands above the water level. In a general way we assigned those separate values. That would be equivalent to about $3 or $4 an acre for the lands above the water line. In assigning those values to the submerged land I do not think we distinguished between the value for a reservoir use for irrigation purposes and the use for domestic purposes. Whatever difference might exist between the value for irrigation purposes and the higher use for domestic purposes I should be inclined to throw into the water rights rather than into the land values. I am inclined to think that the lake is more valuable for domestic purposes than for irrigation.

I think the portion of the value assigned to the Lake Cheesman water rights was about $2,000,000. Mr. Anderson worked it up in detail and I reviewed it with him. In the light of my experience elsewhere it seemed to me that the results which he found was a fair one and I therefore accepted it. We debated a number of points in connection with it but that does not signify that I had any lack of confidence in his judgment. We added in the case of the other land to the value found by the real estate experts, ten per cent to cover engineering, legal and contingent expenses, incidental to bringing the lands together, making plans, surveys, etc., such expenses as in my judgment are generally incurred in purchasing lands for such uses. That is a part of reproduction cost. And it is not an element included in going concern value. The value is not duplicated. That ten per cent is not an operating expense.

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A considerable portion of the construction since 1908 is what may be denominated piece meal construction, though some of it is in large enough units so I don't think that can be said. This construction since 1908 has not been carried on without increase in the overhead expenses of the company. I did not add 12½ per cent to the cost of this construction in my estimate. All of this work was included in my estimate of the reproduction cost of the entire system.

My unit prices on the whole works were somewhat higher than the unit prices for the distribution system work since 1908, because most of that work was done in the outlying districts and though of piece meal construction, was substantially less difficult than the work would be taking the system as a whole. The annual depreciation estimate at page 65 forms the basis of determination of the accrued depreciation as well as the basis for determining the depreciation allowance for the future. In carrying depreciation allowance forward for the future as in Exhibit A.25 the allowance for the year 1914 is increased above the allowance for the year 1913, on the theory that increased demand on the plant requires increased construction, increased construction develops increased depreciation. Therefore, that increased allowance must be made from year to year. My reason for the additional allowance of $30,000 for contingent reserve is to provide an element of safety to take care of unfor-seen conditions, such as bad floods, cloud bursts, etc., which would result in extraordinary expense. To include those in the operating expenses of the year would make very heavy inroads upon the net revenues. If it were extreme it would affect the market rates at which the company could obtain capital. You may have a bad accident from electrolysis which would involve thousands of dollars of damage as has happened time and again in our American cities. Rather than absorb that in one year in operating expenses it is more prudent to make an additional allowance such as this and distribute it over a period of years.

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This fund if not called upon would be a gradually accumulating fund. If it became substantial in amount you could cut it off entirely or reduce the annual allowance. It has generally been found in the operation of public service corporations that it is well to have such a surplus which can be drawn upon when emergencies come. Take the situation with the Tramway Company last winter in the extraordinary snow storm, and the extraordinary expenses growing out of it. To take care of that from the revenues of one year is a disturbing influence. To take care of it in part out of a fund which has been accumulated for a period of years tends toward the stability of the credit of the corporation. I do not wish to imply that the adoption of the figure, $271,094 the average value found by the real estate men for the Lake Archer lands is the exact economic point at which those lands might be retained in the system. We did not attempt to figure the point at which it would be economical to sell those lands. We adopted that figure as more fair for the rating base than the higher figures testified to. I took into consideration the expense attendant upon the furnishing of the water

supply through the West Denver station by comparison with the other supplies. As it is operated, the cost of water from that source is greater than from the other sources, but from the point of view of the available quantity from that source 10 million gallons daily, the cost is practically the same as from the other sources. I regard the difference in cost as more than offset by the increased safety which comes from having that quantity of water available nearer the city where it can be quickly reached. Assuming the use of such a valuation as $600,000 for those lands, fixed by Mr. Young, my conclusion as to the economy of that source would be different. If the company could realize that sum of money for those lands it would be wiser to give it up as a source of supply. The water power
pumps at West Denver operated by the water developed
381 through Lake Archer have during the period, concerning
which I made investigation, 5 or 10 years, I am not certain which, furnished about 1/3 of the supply from that station. The West Denver station is fully equipped to pump all of the water it furnishes by steam, but nevertheless there is a saving to the company in pumping part of that supply by water power. I cannot answer as to whether that saving is commensurate with a fair return upon the value upon that portion of the property known as the Lake Archer land. There are a good many questions involved in that. It is possible that a necessity for the continuation of the water rights is involved.

It is possible that if it can be disposed of for $600,000 or more there would be an economic waste in maintaining it for its present use. I dislike to say definitely without knowing all of the elements of my problem. I referred to the item of abandoned property simply as giving the measure of the total depreciation which the investment here has suffered. It was not included in the reproduction value. Except as it sheds a side light on what is a fair allowance for depreciation it has no connection with present values. It is an element to be considered in connection with original cost.

The original cost of this property cannot be determined. The records do not exist. There is no single element that is always of controlling importance in the ascertainment of present value. Original cost particularly in a young plant is an important element if you can find it. The older the plant is the less of a measure will the original cost be under present legal conditions. In determining unit prices on the distribution pipe system we considered both the prices of labor and material prevailing during a period of years. I think today looking forward for a period of 5 years we are facing a rising rather than a falling market. That element caused us to consider the average for the preceding 10 years as a proper figure for present reproduction cost. If the coming 10 years should have a downward tendency the unit bases would not be correct. But we cannot go much lower than we have gone without putting pipe foundries out of business unless some entirely new process is developed to enable them to make pipe at a very much lower figure. We took into consideration the prevailing price in formulating our estimate.

Allowance for paving over mains was made on the theory that whether the mains were there or not when the paving was laid a reproduction of the system as it now exists would necessitate the tearing up and relaying of the pavements. I believe also that the plant is more valuable from the viewpoint of the stability of the investment with pavements than without. Expenses of operation and maintenance also are greater with pavement than without. Those elements are to be considered in rating as well as in purchase cases, as I see it. The difference in the cost of excavation for three, four and six inch pipes, though the trench is the same width, results from the difference in depth. The cover over the pipe being the same. In determining the reproduction cost we took into consideration the fact that if one were actually reproducing this system some of the pipes lying under or adjacent to street railway tracks would not be laid in that position and made what in our judgment was a proper allowance for the conditions which exist. I had reached the conclusion as to the fair value of this property prior to the passage of the ordinance in question in this litigation. Those figures did not differ materially from the figures concerning which I have now testified. That determination was based principally upon investigations made by myself or my assistants. In making our comparisons of physical valuations with the figures of the Utilities Commission engineers we eliminated the $375,000 allowed by them for development expense.

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I understood that the Utilities Commission engineers did not allow any value for water rights. If it is true that their land values contained any allowance for water rights then the tables of comparison should be reconstructed to exclude from consideration the real estate and make the comparison on structural items only for the final comparison. As a matter of fact the comparisons are made separately in my tables so the items can be easily segregated.

The item of $144,000 depreciation allowance for the year 1914 is an estimate. This is true of all figures presented carrying forward from Oct. 31, 1913, data bearing upon the plant. In table A22 the absence of figures in the column headed Public Utilities Engineers and opposite the item, going concern value and water rights does not imply that the engineers did not give consideration to them but merely that they did not place values upon them, other than you may consider the development expense of $375,628 as a substitute for going concern value.

It is my understanding that they did consider both these items but placed no value on going concern except as the development expense item may be applied to it, or upon water rights other than for irrigation purposes incidental to their use upon certain lands which appears in the land values. I understand that the Public Utilities engineers did recognize certain water rights and included a value for them in the lands outside of the city. To that extent the figures dealing with their net physical valuation included such value as they assigned to those water rights. In exhibit A19 in the computation of development expense I started in 1895 with an assumed capital investment of $7,000,000 represented by the bonds outstanding, after determining the net revenue and the

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fair return at 7 per cent plus 1 per cent for depreciation. I took the difference between the actual net revenue of that year and the estimated fair returns and showed that as a revenue deficit for the year. This deficit I added to capital account for the year 1896 for the purpose of the computation for that year. The same method is carried through the whole table. That method of computing development expense is used by the Wisconsin Railway Commission. The second table is the same with minor corrections in the net revenue. The third and fourth tables include the addition to capital account of items of construction actually made. And the fourth table is computed on one per cent less rate of earnings than the third. I think the deficits should carry compound interest for the reason that in a computation to determine development expense you consider the deficits as an investment. The owner being entitled to a certain annual return. Had he gotten his return he would have enjoyed interest upon it. And interest again the following year upon the previous interest account. So as an investment he would have enjoyed in fact, compound interest. Compounding the deficit in this computation carries it forward in precisely that manner. If the investor 20 years ago lost a certain sum of money in interest payments he has today lost not only that sum of money but the compound interest upon it which he would have enjoyed had that sum of money been paid over to him 20 years ago.

In this computation the question of bond issues is not considered at all. The rate of return is considered as necessary to produce so much net revenue. It does not matter how that net revenue is disposed of, whether it is paid out as interest on certain bonds or whether it is paid in dividends or some other disbursement made.

The moneys paid out for lease rights are considered as operating expenses except the payments on account of the lease of the D. U. W. Co. from the S. P. C. & R. Co. which is not taken into consideration at all. I have made no separation between the properties of the company. Rentals on the other leases are paid to outside interests. In the matter of the rental paid for the use of the city's mains I have treated that as in the case of rental on other property, as an operating expense, and have considered in these computations only the actual revenues derived and the rentals paid. I do not consider that the company is occupying the streets without compensation to the city. It is rendering the city service and is furnishing free water to the city for various purposes to a substantial amount.

384 In the computation at page 13, Exhibit C, dealing with the question of safe yield of the various water sources, I have considered as the safe yield, the amount that could be derived safely in dry years. In the table headed "Safe yield of water sources for irrigation purposes" the quantities there set forth are the estimated quantities for 365 days in the year. The safe yield for domestic purposes would be somewhat less than that. You would get that quantity under average conditions but not in the driest year. The quantities stated may be regarded as the yield for domestic purposes under average conditions but not the safe yield because we use the term safe yield in application to dry weather conditions.

Not to the average conditions that prevail upon the water shed. In irrigation practice you assume more nearly average conditions.

The words, "Yield for domestic purposes in the average year" would mean substantially the same thing in the heading. I will have to refer you to Mr. Anderson for details as to the valuation of different water rights.

Essentially the responsibility of fixing the values of water rights rests upon Mr. Anderson though I went over the unit figures with him and the final results merely to satisfy myself that the results arrived at appeared reasonable, that I might incorporate them in my valuation. As to the value of lands covered by reservoirs or other works, they were arrived at by joint consideration. The additional value allowed for such lands was by reason of their availability for the purpose, rather than by reason of the use to which they are put. Generally the criterion has been the reproduction cost of those lands based essentially upon present market value together with allowances for the cost of assembling these tracts for these purposes. We gave consideration to the existence or non-existence of other lands available for the same purposes, for instance, it was considered that the Platte Canon Reservoir site was less valuable by reason of the fact that other sites could be obtained near by, than the Marston Lake site or the Cheesman site. These valuations were arrived at substantially without consideration of the fact that the reservoirs are used in connection with a domestic water supply. I cannot say absolutely without, because in the case of Marston Lake its advantageous proximity to the city was considered.

I did not consider in arriving at the value of these reservoir lands that they are used and useful in earning a return from the supplying of water to the City of Denver. Exhibit A22 shows the land values to be $1,014,000. Page 64 of exhibit C. shows the land value $920,103. The difference is due to the fact that in Exhibit A22 interest during construction has been added. From the tables in Exhibit C. the use of water by the city of Denver in cubic feet
385 per second can easily be determined by applying the proper factor to the acre feet or million gallons set forth in the table. I know of no figures that would show the average use by the company of water for irrigation of lands or the acreage irrigated. The safe yield of all of the water sources for domestic purposes, taking into consideration the driest conditions of the driest years would be from 140 to 155 cubic feet per second.

No strict line can be drawn between repair account and depreciation account. It is good judgment however in the operation of public utilities to charge liberally into the repair account rather than depreciation. Expenditures for repairs are not an offset to depreciation nor is ordinary maintenance. Certainly the depreciation allowances which we have made in this case do not contemplate the charging to them of ordinary maintenance and repairs. I used the sinking fund method as one of the methods in ascertaining the going concern value assigned here, also in determining the allowance for annual depreciation, that coupled with judgment. I stated that I made no allowance for salvage value of the items at the end of their term

of useful life. Allowance for annual depreciation is really an annuity which at a certain percentage will amortize the property at the end of a fixed period. I assumed the period of the useful life of each particular item. The results that I have obtained here are practically the same as if I had used the straight line method. As indicated by the past experience of this company, under the straight line method it would have required an allowance of approximately one per cent per annum on the structural values. Or in other words, $130,000 to $140,000 per annum. The additional allowance of $30,000 per annum for extraordinary contingencies is based upon the past experience of the company in so far as the contingencies do materialize but not as to the making of the allowance. That experience indicates a necessity for such allowance if the fair average rate of return is to be enjoyed by the corporation. The past history of the company does not indicate that it has been required to spend that sum each year for such contingencies because the value of the property going back over a period of years has been much smaller than it is now, in other words, if $30,000 is fair today it would not have been fair ten years ago or would it be fair ten years hence.

Experience in the future may prove that the allowance that I have made of $30,000 is too large. It is true that in a purchase case or for purchase purposes value is largely what may be denominated an exchange value, largely dependent upon the earning capacity of the property. In a rate case the question is what the earnings shall be. It is true also that in determining my valuation here I have assigned a value to water rights largely in excess
386 of their original cost. It is partially true that the computations of going concern value are based upon the return under rates in effect here predicated upon the assumed value of water rights. But I have also figured going concern value upon an assumed rate of return entirely independent of the actual rate of return obtained here and it is my judgment that the going value or development expense that I have found is substantially less than the actual expense to this company to build up its business.

Exhibit A19 indicates ten different results of computations of going value or development expense with results varying from $990,000 to as high as $5,750,000. It is not true that going value or development expense can be estimated or figured at almost anything that the individual who is doing the figuring wants to. It certainly is not true if the individual doing the figuring is intellectually honest. I do not believe that anyone who is intellectually honest would be guided in the least by any preconceived idea of what should be allowed for going value. The final decision as to going value or development expense is a matter of judgment as is the case with almost everything in the matter of valuation. I took into consideration in arriving at both the going value and the general value the fact that the company's franchise had expired.

I do not believe that public service plants operating under franchises have been operated with any such disaster in view as the scrapping of the plant at the expiration of the franchise period. I do not think that the rates have been based upon any such assumption

or that the returns enjoyed would make it equitable to apply any such drastic rule. I believe that if it was fairly to be assumed that the city shall proceed to duplicate this plant within the next five years that it would be equitable for this company to increase its rates to liquidate the loss in value which will occur in the next five years during the period of construction by the city of its new plant.

The company's franchise is gone, it has no further rights in the streets, it may be ordered out of the streets, but the rates charged have not been such as to enable it during its life to liquidate its entire property excepting its scrap value. Then according to my view it is as reasonable, just and fair to the public that that loss in value should be liquidated in the next five years as prior thereto. It has not been common experience in this country that cities would take such action as would lead to the wiping out of property values to such an extent as is implied by your question.

It made no difference to the company as I see it whether the city undertook its construction operations before or after the end of the franchise. Had the city elected to notify the company five
387 years before the expiration of its franchise that its plant would have to be scrapped at its termination, the company then would have made provisions in the remaining five years, just as I believe it should make provision in the coming five years if the plant is to be scrapped. I assigned a value to the connections to the company system notwithstanding that those connections were paid for by the consumers. The gross amount on page 64 of Exhibit C. is $157,543 the net amount $126,034. I considered that as a betterment of the plant that could not be removed. Just as the tenant of a building may put in a furnace, steam heating or lighting plant, and though he has paid the cost of it, it remains the property of the owner of the building. I have considered that the corporation cocks could not be removed, even though the owners service was reconnected to some other pipe system. The service pipe could be removed but not the corporation cock.

Those elements are no more to be considered in a purchase case than in a rate case, if it is a fact that the rates shall be predicated upon the fair value of the property. The property of the company is more valuable by the reason of the service connection whoever paid for it. If the rates shall be predicated upon value which has become inseparable from the plant it seems to me that there is no difference between the two. If it be true that the profits of the company from the installation of consumers' service connections figured at four per cent will today amount to over $100,000, I have given the city credit for those profits in discussing the return which the company has enjoyed. I have also charged to the company that profit in the consideration of development expense. Because if you deducted the profit actually enjoyed from making these connections you would have increased the annual deficit in the operation of the company which make up development expense by just that amount. The method that I have used in determining the question of deficits I think is a proper method.

Cross-examination by Mr. Patterson:

I do not know anything about the bonds of the S. P. C. & R. Co. owned by the D. U. W. Co. I have not considered securities in determining the value of the property. In my judgment the allowances for engineering and contingencies, interest during construction, preliminary expense, etc., are not heavy allowances. I know that the Wisconsin Commission combines engineering, superintendence, legal expense, interest during construction, and contingencies, and has not allowed more than 12 per cent for the aggregate of those items. I also know that the plants which it has valued are very different. I do not believe that this is an undeviating rule or that the commission has an undeviating rule. I do not know
388 whether the D. U. W. Co. at the time of its organization paid to the companies whose property it acquired the full value of that property. The companies had been having a rate warfare and whether either was at a disadvantage at the time of purchase, so that it received less than a fair value of its property, I do not know. I have not attempted to make a division of the items of engineering and contingencies. Engineering costs would probably range from 6 to 8 per cent. You can reduce the engineering to four or five per cent and make mistakes which will cost you the difference.

The Wisconsin Commission may fix it at 4 per cent but engineering work cannot be done at four per cent. I think it would be from 6 to 7 per cent on such a plant as this. I presume my present connection with the D. U. W. Co. is as consulting engineer. My first connection with the company in connection with this litigation began early in Oct. last. I was here before in 1912. At that time I appeared before the Master in a hearing at Hartzel and gave testimony upon subjects upon which I had information. I was here on that occasion about 2 weeks. The D. U. W. Co. employs a very competent corps of engineers. Mr. Thomas is chief engineer, Mr. Anderson has been employed as consulting engineer from time to time. I do not think that he has been on a continuous retainer at any time. All of the expenses of the regular engineering corps of the company are not included in regular operating expenses, part of them are charged to construction according to the amount of construction that is being carried on. I have not charged 12½ per cent engineering to the cost of this plant in addition to the expense of the company's engineering department. There is no connection between my 12½ per cent allowance and the charges made to the construction account by the company. You are confusing the original cost with my reproduction cost. We used the company's construction costs where we could get them as an aid to judgment. We gave great weight to the original contract and original cost at Lake Cheesman. There are a great many items in the construction account on which we received no aid from the records of the company. Generally the construction cost could not be segregated from the records of the company to apply to every item of property. It was only in cases where the construction cost segregation was sufficiently complete to clearly identify the property and in which the construction was

recent enough to make figures significant that they were an aid in forming judgment. We got in the aggregate what were reported as the construction costs of different parts of the plant since 1895. These aggregate figures were not segregated so as to make it possible to determine to what items they applied. It is not safe to assume
389 that the total expenditures for hundreds and thousands of items all lumped together on construction account are a safe criterion of present value. I did not proceed as you infer. I did not supply omissions in the accounts. The fact that these items are not segregated on the books is the fault of the bookkeeping custom that applies the country over. If it be presupposed that the corporation should keep a complete record of all construction items and quantities, abandoned structures, etc., a complete detailed record of the segregation of costs, then it is true that we did not find such detail here and it was the fault of the company, if that is your premise. It is not true that as your question implies my valuation was built up from an assumed amount in 1895 of $7,000,000 plus the construction costs of this company. Those figures were taken from the figures of the Public Utilities Commission engineers and used simply in a computation showing one method of arriving at going value. I used those figures in order to determine the difference between the actual rate of return to the company during that period of years and an assumed fair rate of return of 7 per cent plus 1 per cent for depreciation. I am unable to say whether the construction account used for the purpose of this computation contained engineering expenses, except as related to the construction items in the last five years on piping, there it did include such an allowance. Whether every account contained its just share of engineering I do not know and no man can tell. I have made no direct use of the construction costs as they appear on the books of the company in determining the value of this property. I have used them as an aid to judgment. Where engineering costs appeared in the construction record we eliminated them and used the basic cost without any such allowance. In the particular cases as I remember them the engineering charges were greater than the allowance which I made. I undertook to find out what the actual engineering cost had been and found it impossible to ascertain that from the records of the company. I made an allowance for paving parking and railroad crossings on the theory that that cost would be incurred in reproducing the system. In ascertaining the reproduction I mean that I estimated the cost which would be involved in reproducing the plant as of the date of application.

In order to value the property I do not actually lay the pipe. Theoretically you are constructing a new plant, practically similar to the one being inquired about and giving the cost of the construction. I am a member of a committee of the American Society of Civil Engineers to formulate principles and methods for the valuation of public utilities properties. The outline of that report was read at the January meeting of the society but it is very far from what
it will be in its final form. The report states in part: "The
390 principles and methods involved are now being carefully considered by many public service commissions and the

courts, as well as by engineers, lawyers, and various societies having to do with public utilities, the subject is clearly in a developmental stage and any conclusions reached at the present time must be considered as tentative." In the third paragraph on page 6 appears: "It is obvious that a valuation for use before a court or public service commission must, in order to be sustained, be made in conformity with existing laws and the decisions of higher courts."

"It is recognized however that the whole subject is in a developmental stage and while your committee has been guided largely by the decisions of the higher courts and public service commissions it recommends what seem to be sound views and desirable changes in practice, even though not wholly in accord with such decisions." It has been well settled by the highest courts that the owner of such property is entitled to a fair return upon the fair value of the property utilized in or necessary to the service. Justice and equity alike require that in any regulation of rates there shall be taken into consideration, two distinct features, 1st, the annual return covering interest and profit to which the corporation is entitled for the use of its capital, having in view the risks incidental to the investment. 2nd, An allowance sufficient to provide for the net depreciation in the value of the items of physical property whether resulting from decay, wear and tear or other cause, the amount of such depreciation allowance to be sufficient to amortize all such items of property by the time they cease to have value.

"Public policy requires that in the absence of any plan for public ownership of public service property the earning capacity of such properties may be made sufficiently attractive to induce capital to provide the works needed for the public welfare and convenience,—to maintain them in proper condition for providing good service and to extend them reasonably in advance of the needs of the community. The public may be as injuriously affected by too low as by too high rates."

"If the public regulation of rates to be charged by public service corporations is to become general the fairness and uniformity of methods of valuation for rate making will have an important influence upon the supply of capital for such enterprises, and upon their maintenance and development so that they will furnish satisfactory service to the public."

"As already indicated no complete and definite rules have been laid down for the determination of the fair value of a public service property. The matter is so difficult that courts and commissions have in the majority of cases stated that they have given weight to valuations determined by several different methods and that after due consideration have reached a certain conclusion which
391 they announce without disclosing definitely the method by which the conclusions have been reached. This appears to have been a wise course to pursue during the developmental stage of this subject, in view of the weight as a precedent given to important court decisions."

The committee tried to perform a dual function which was dangerous as subsequent discussion has made very clear, for we have been

found fault with by a great many lawyers and engineers. Fundamentally the question at issue is this: Shall investment cost in the property be the proper criterion of value or shall the fair value of the property including increment in value which has come with the lapse of time be the criterion? It becomes then a question of administration. I think that no member of our committee felt that the actions which we have outlined here could be made retroactive.

Our report as I see it is in substance this: And this it seems to me is the important thing which you have absolutely overlooked. Under constant and long time commission control it was the view of the committee that the rating base would come more and more nearly to approach the investment cost, rather than present value or reproduction cost. The report as originally drawn referred not to investment cost as it does today but to reproduction cost as the criterion of value. It was then held by a very strong member of the committee who has since died, that under public service commission control, and constant commission control,—I do not mean to imply a commission control which has come in for one or two years—investment cost, the fair investment cost of the property would become the basis of rating. It was the view of the members of the committee that in the case of recently constructed properties,—the investment cost was the best evidence of reproduction cost, and that, therefore, as applied to recently-built properties the terms "investment cost" and "reproduction cost" were practically synonymous, except in such cases as there might have been injudicious expenditure. As you get further and further away from recent construction, it was the view of the committee that investment cost could not be used as the basic criterion of value. In other words, the report of the committee, as I see it and as I saw it when I signed it, sir, relates to a condition of affairs under public service commission control, extending over a period of years,—rather what we are tending toward, as we believe, than what lies behind us in the decisions of the Courts.

When you come, however, to make a valuation of a property, as I have made in this case, I conceive it to be my duty to follow the precedents laid down by the Courts, as I see them, rather than what I believe will be the future tendencies.

392 Now, as bearing upon the utilization of the investment cost under constant public service commission control, rather than the reproduction cost, it was the view of every member of that committee, sir, that the rate of return upon such a base would inevitably have to be increased over the present rate of return, as measured by the fair value of the property, if capital was to be obtained by the corporations for future extension of the works. Now, if you adopt, the theory that investment cost shall prevail hereafter under continuous public service commission control, future extensions will be made in the light of that assumption and that will become, in effect, the book cost of the property, watched over by your public service commission.

It is my own sound judgment, Senator Patterson, that the point of view of the readers of this report has been so totally different that the report, as it stands, is not a safe document to go out, and I be-

lieve that those matters to which I have just referred, and others will be made clear in the report of the committee finally adopted, if it is possible to adopt such a report. Now, if it is—if we come to the basis of investment cost hereafter as the criterion of value, and take into consideration the other elements through the rate which we fix which shall be enjoyed upon that base, the rate, as I said, will be, in my judgment, increased. If you adopt that basis, then the original conditions of construction must, of course, logically prevail, as outlined in the paragraph which you quoted, sir. If it is true, however, as I believe it to be true, under the present—the past decisions of the Courts, as I read them—that reproduction cost shall be on the whole, or is on the whole, of the greatest importance, then I submit and I have so interpreted the law always, that the present conditions shall prevail. In other words, the plant shall be reproduced under conditions prevailing as of the date of valuation. That is the essential difference in the two points of view."

After the general statements in the report, specific questions and matters are taken up under different subheads, always under the one central theory, that it treats of investment cost under continuous public service control rather than present fair value. It is desirable to determine the actual cost of structures recently built, we always try to do that.

To take a single paragraph out of the report as you have been doing is in my judgment to present a garbled version of the report.

(Argument between Mr. Patterson and the witness as to the effect of authorities in cases involving allowance for pavement over mains. Finally stopped by the Master on the ground that that was a question for the court to decide.) The net allowance by us for the
393 item of corporation cocks was $126,034. If the service pipes were the property of the company, by reason of ownership, then of course I should include them in the rating base. As a matter of fact I have excluded the service pipes in this city drawing the line at the corporation cock, which cannot be removed, which is inseparable from the pipe system. The service pipes can be removed without injury to the pipe system. The principle of reproduction cost as applied today is determined by present conditions of the property. For the purpose of such inquiry the conditions existing at the time of original construction have very little to do with the case. Under the reproduction cost theory you attempt to determine the reproduction cost of the plant as it is today.

We allowed for the lands at Lake Cheesman the sum of $200,000 divided approximately on the basis of $200 an acre for the submerged land and $3 or $4 an acre for the remainder. I ascertained what the cost of the 8436 acres was. The cost to the company of the land under water was not segregated. My assumptions and distribution have nothing to do with original cost.

(Restatement of reasons for employment by the D. U. W. Co.)

Part of my duty was to prepare data for the engineers of the Public Utilities Commission. I had a few interviews with the commission engineers. We may have discussed matters that should be included in the valuation of the property. I had some corre-

spondence with the commission bearing upon omissions and errors in their report and at the request of Mr. Van Diest I prepared some data on decisions and valuation cases for rating and other purposes. We may have discussed the question of pavements but I have no distinct recollection about it. I understand by going value that element of value in the property growing out of the established business, or the difference between its value without any business attached to it and enjoying no revenue and its value with the attached business and revenue.

There are two general methods of determining going value, one, the development cost method used by the Wisconsin Railway Commission, which involves the ascertainment of earnings, expenses, and rate of return, and carrying forward from year to year, plant cost, depreciation and deficits in earnings, as set forth in exhibit A. 19. The second method involves the determination of the reproduction cost of the item, by comparing the earnings enjoyed by the existing plant with the earnings of an assumed similar plant during the period of years assumed to be necessary for this comparative plant to acquire the volume of business of the existing plant. In ad-
394 dition to these methods we have the judgment of managers of public utilities that the value of the item may lie between one years' gross revenue and something in excess of that amount. The decisions of courts and commissions do not outline the specific method used in arriving at that value. Reference has been made in a number of such opinions to the fact that the methods mentioned have been used. The Wisconsin Commission has referred to it and it is my opinion that it was fully discussed by the Wisconsin Court in the recent Appelton Case.

Assuming continuity of operations, I do not believe that there ever is a time in the operations of the plant when additions to going value cease.

It has been suggested by certain individuals that going value may be disposed of by capitalizing the cost of establishing the business or by absorbing what the establishment of the business has amounted to in revenues but I do not understand it to be the law. To pursue the latter method to a logical conclusion, assuming that there have been no deficits and that that method of computation shall be used, is to arrive at the result that the plant with an established business is no more valuable than a plant without an established business. Which seems to me cannot be the case. The cost of establishing the business is one of the criteria of going value or development expense. The cost of reproducing that business is another. Personally I believe that the cost of reproducing the business is the safer criterion of value in the older plant. In a recently constructed plants the original cost of developing the business is the best evidence we can have. I have no knowledge of the cost to the D. U. W. Co. of establishing its business. It cannot be determined except on assumptions.

The cost of educating the public to the advantage of water under pressure is not the sole element of expense involved in the development expense or going concern. The development expense is made

up very largely of the burden of interest charges, the carrying of the plant to a point where the earnings of the plant will carry it. Of those facts we have knowledge in the present case. We know the revenue derived and we know the approximate amount of those charges. We have no knowledge of the revenue before 1895. The two plants of which this plant was formed had been in operation prior to that time. Information as to these earlier operations cannot be obtained. To the extent of the then existing revenues the business then taken over was an established business, but it has grown very markedly since that time.

It is true that I did not start with the year 1895 to determine development expense according to the Wisconsin Railway
395 Commission method. It is not true that the going value which I placed upon this plant was founded essentially upon the results thus obtained. They were of consideration but there were other considerations which were of greater import in the fixing of my judgment. It is not true as you infer that extensions made from time to time in the pipe system and supply works come into use immediately in the sense that the use is complete, or that the return is commensurate with the cost. They come into partial use. ("Discussion of the rate of growth of Denver from 1870 to 1894 as set out in the chronological statement, page 8, Exhibit C.")

Exhibit A. 20, shows the total revenues of the company from 1895 to 1913 and the expenditures for operation, taxes, and repairs, excluding depreciation or disposition of net revenue. The total revenues for 1895 are $628,333, operating expenses exclusive of depreciation $160,267. For 1910, Revenue was $799,771, operating expenses, $227,581. 1905, Revenue was $1,009,763, operating expenses $285,252. The gross revenue from 1895 to 1905 increased nearly $400,000 and operating expenses about $125,000 From 1905 to 1913 the revenue increased about $375,000 and the operating expense $185,000.

The increase in gross revenue from 1895 to 1905 was 60 per cent. The increase in operating expenses from 1895 to 1905 was 78 per cent. The increase in gross revenues from 1905 to 1913 was 37 per cent, and the increase in operating expense from 1905 to 1913 was 65 per cent. The ratio of increase in operating expenses in the last period was less than in the first period.

In 1895 the office expenses were $44,439. In 1905 $57,127. In 1913, $80,808. The office expenses go up and down. In 1912 they were $67,000. In 1895 the legal expenses were $18,591. In 1913, $45,717. The increase in office expenses for 1913 I think was occasioned largely by the investigation work of the last year in connection with the inventorying and valuating of the property, which I believe was a very necessary operating expense. We could not have refused to give the Public Utilities engineers the information for which they asked. I consider attorney's fees proper expenses to be charged against operation.

I assume that the company believed that it was in the right in the litigation in question. In this litigation to set aside the decision of the city council as to water rates, I consider the attorney's fees ex-

pended by the company a proper item of operating expense. I consider the amount of the attorney's fee here recorded very reasonable considering the work which was required. The larger sums
396 charged to legal expense involve litigation incidental to the rating and franchise cases. The last pumping works were installed, I believe, 5 or 6 years ago. The increase in pumpage expense, shown by Exhibit A. 20, from 1903 on, was due primarily to the scattering out of the city in different directions and to the building of homes on the hilltops. It was just at that period that Capitol Hill reservoir No. 2 was built and extensions made of the Capitol Hill pumping plant and the Ashland avenue stations, indicating increased consumption of water in the high districts.

The Ashland Avenue Pump station was completed in 1907. The construction of the station was charged to construction but the pumping of the water is charged to operation. That is what you were talking about in that table.

I think the increase in the cost of operation in the pump stations is a logical and natural increase. I cannot tell you in detail about the variation in the ranch expenses, except that it is my recollection that a greater area of land was under cultivation at the end of the period than at the beginning.

The decrease in Ranch expense from 1911 to 1913, was due to the fact that one of the large ranches which the company had owned and operated up to that time was sold, the Harriman Ranch. The same explanation I believe applies to the ranch revenue. The increasing cost of service repairs is due to the fact that the plant has reached an age where the consumers service pipes, in many cases, have about reached the end of their useful life and are being replaced because they are becoming clogged with rust on the inside and the consumer cannot get sufficient water through them. I have not heard anything about a burst*ed* main last Saturday or Sunday. I do not believe that the distribution pipe system is likely to be seriously damaged by electrolysis. (Reading into the record by Sen. Patterson of extracts from work on electrolysis by Samuel S. Wyer.)

There are two reasons why I do not believe that the pipes in this system are affected by electrolysis. First, we have very little evidence in this country to show that under average conditions the wasting of pipes due to electrolysis is a large factor. Second in this system some 8 or 10 years ago the pipes were bonded with the rails of the tramway company, the bonds being carried back to the power station. Before that time there had been trouble at a few points, a few times in proximity to the power station. More particularly with the service pipes where the stray current left those service pipes. In some cities street railway plants are required to provide independent insulated return circuits to carry the current back to the power house.

397 It is practically impossible to determine with accuracy the extent of injury from electrolysis in any system, all that we have to guide us is past experience in those cases where the condition has become so aggravated as to require replacement. I do not know

how many bond connections there are between this pipe system and the rails.

I do not know much about the history of the property listed in Exhibit C. as abandoned property. I do not know anything about the initial installation of Lake Archer and the West Denver plant nor how the water was supplied. In a general way I am familiar with the steam power at the West Denver plant. There is sufficient steam capacity there to distribute the water that is distributed by that station, assuming that you wish no reserve capacity. I saw the station running a few days ago when all the machines, including the water power pumps were running during the hours of peak load. (Discussion of the capacity of the West Denver station and cost of installation of new steam pump to take the place of water power pumps, supplied from Lake Archer.) Objection to interrogation concerning cost of replacement by steam unit, sustained. It is my recollection that we had original costs in the case of a few of the lands connected with the system. I think as to some of the lands in the Marston Lake region and it is my impression that we did on some of the ranches. I don't know what relation the present valuation of the lands bears to the original cost. In the light of court decisions, as I understand them, it was not necessary that we should make that investigation. It might be true that if the water company owns a very large amount of real estate that some consideration should be given to the appreciation of lands in arriving at a rating base. I remember of no case in which consideration or weight was given to that except in the Spring Valley water cases where substantially one half of the water company's property was made up of lands which is a very abnormal condition.

In this case the lands amount to a very small percentage of the value of the whole property. In water works generally in the East, land values range from 3 to 8 per cent of the entire property except in systems where there is a large reservoir system and large drainage areas, but in general less than 10 per cent. Here the figures are not very different. On the Pacific Coast in the case which I cited, nearly one-half of the property lay in lands, that grows out of course of the water right conditions. The appreciation in value of the lands may be of consideration in those extreme cases.

I think that recognition should be given to the higher use made of land in considering their value. By higher use in connection with water works I do not imply a monopoly condition. But in
398 the sense that an agricultural use is higher than a grazing use of the same land, I mean that that value may be taken into consideration. Special value, or availability and adaptability, should not be created for land when such value did not exist before investigations were made that called attention to the availability and adaptability of those lands for a particular purpose. In cases where the property is especially available and adapted only to the community or public utility acquiring it, it is against sound public policy and a just consideration of the right of the public to have public works created at a fair cost. That is limited to the situation where the property is available only for the one public use and pre-

sents quite a different situation than is presented by the property in question here.

The item of $84,747 in connection with Lake Cheesman, entitled, "Dam, preliminary and flood expenses" is made up partly of an allowance for the hazards involved in connection with such work and partly of the cost of work done on the original dam, which was incorporated in the present structure after part of the dam was washed out by the flood.

It is my recollection that the expenditure on that first dam, exclusive of the cost of litigation following the flood, was about $124,000. Then follows for the present dam, masonry $485,320 then the item, cement, $303,780. That does not represent the whole cost of the dam, there is the excavation, tunnels, and other items, also engineering and contingencies and interest during construction. The life of the dam cannot be estimated. I think it will far exceed what I have put down in the depreciation tables at page 65, exhibit A, 10. The item of stand pipes is stated on page 93. Item 5, two stand pipes at Cottage hill, the estimated useful life is 28 years. In the water works life tables published by me, (see reference p. 2026 record) the useful life is given at from 25 to 40 years. In this plant I have estimated the life of the stone and brick buildings at West Denver at 50 years, frame buildings 33 years. At Capitol Hill I estimated brick buildings 33 years, wood buildings, 22 years. In the life tables I have estimated masonry buildings 40 to 50 years, wooden buildings, 20 to 50 years. Cast Iron pipe I have given 16 inch and larger pipes 94 years, 10 to 15 inches 72 years, 6 to 8 inch 56 years, 3 to 4 inch, 41 years. In the life table published by me I have estimated pipe of large diameter at 50 to 75 years, small diameter 20 to 40 years. The difference between the local estimate and the life table is not very large. The life of wood pipe in this system is estimated to range between 41 and 47 years. In the life table published by me it is estimated from 20 to 30 years, but the fact is that some of the pipe in this system is nearly as old as the limit assumed in the life table and the pipe is still in sound condition. We estimated the
399 life of the hydrants here at 41 years. The life tables published by me give it at 40 to 50 years. The estimated life of the pumps here is 41 years, boilers 23 years. In the life tables published by me pumping and auxiliary machinery is given at from 20 to 30 years, the average age of the pumps here is already 27 years. We do not rate pumps upon any such arbitrary basis but upon their condition and ability to do service. You imply that regardless of the condition or character of the machine a man must adopt a list of estimated ages which was made years ago with perhaps a certain set of conditions in mind, and that simply because that list has been so printed, therefore, regardless of the condition of the property, a man should always stick to the list.

At West Denver station page 88, Exhibit C, I gave the life of one set of boilers, 23 years, another set 20. At Capitol Hill 24 years, at University Park station 15 years, Montclair Booster station 21 years, Ashland Avenue station 21 years. The life tables give the average life of boilers at 12 to 16 years, many of these boilers are already

older than that, still doing good service and still approved by the boiler insurance companies. I might say that those tables were made at a time when I was considerably younger and had had less experience than today. As I have stated, many of the structures in this plant are actually older than the useful life which I have given in the tables and yet are in excellent condition and destined to be in service for many years yet to come. I conceive it to be the duty of the engineer to pass judgment in the light of conditions as he finds them, not in the light of any arbitrary tables, least of all to be bound by anything which he has written before, simply on the account of a desire to be consistent with what he has written. In a general way those tables represented what I then believed to be the general limit within which the life histories of such structures generally lay under the conditions with which I was familiar. The article was written a number of years ago, and you will find in it the statement, that while these may be general limits there are many instances on record within and without those limits. The work on the Sullivan Reservoir was done before the time of the D. U. W. Co. Up to this time it has not been in use.

The structures upon which valuation is placed there are the reservoir structures themselves and have nothing to do with the diverting works in the bed of Cherry Creek. The valuation amounting to $160,164, depends upon a future use of the reservoir by the company. What a subsequent management may do with the reservoir no one knows. I do know what the intention of the present management has been and is. I have estimated for a depreciation allowance for the year 1913, $138,000, and for the year 1914,
400 $144,000 and a contingent reserve fund of $30,000 per year in addition to that. This plant will be forced to serve the city, whether it likes to or not, at least until a new plant is partly constructed. I estimate that the construction will require from 5 to 6 years if they commence now. The depreciation allowance set aside during that period may be used by the company in any way, subject to the requirement that it be accounted for to the public as depreciation upon the property. The consumers will have received a return in service in that interval of time for the rates paid. The plant is depreciating each year, depreciating in the service of the city. When the new plant is completed the people will have wrecked the company's plant, but while the wrecking process is going on the plant is actually wasting each year to the extent of the estimate, and the city has had the equivalent value in service and has used the service during the time that the plant has depreciated in that amount. Why should it not be replaced to the company?

Cross-examination by Mr. Nye:

All useless property was eliminated from the gross total of the property which I valued. The pumping plant at Platte Canon was included in the valuation. In my judgment it is useful, it enables the company to make use of the conduits ordinarily used to carry raw water, as filtered water conduits in case of emergency. I do not

know whether it has been used for any extended period. It is my understanding that the raw water conduits are so connected as to make this use possible. I did not make an examination of the records to ascertain to what extent those pumps had been so used. It is my understanding that these pumps may take their supply from the slow sand filter beds or from the underground source through a pipe that runs beneath the pump station. They are emergency pumps entirely. Most of the water delivered to Denver is measured at Wynetka. The Cherry Creek supply is measured at the Capitol Hill station and the Mississippi Street supply at West Denver.

In determining the quantity of water delivered to the city, I have made no allowance for loss in transit after leaving the point of measurement. By consumption, we mean the quantity of water which is supplied. A portion of that is always lost in the mains and services and goes into the per capita rating of the plant. In other words the reading of the meters on the consumers services never accounts for the total quantity of water supplied. If all of the water supplied was measured both at the point of supply and the point of use the measurement at the point of supply would be taken to represent the consumption, though both measurements
401 might be stated to indicate the amount of water unaccounted for and waste, but ordinarily the records of consumption include all such losses. The Public Utilities Com-ission engineers had been at work from one to two months when we commenced our valuation. The element of value developed by the use or utility of any structure was no part of the valuation assigned by us to the physical structure. The valuation placed upon them was our judgment of the reproduction cost, in other words as to Cheesman dam, for example, so much masonry could be constructed there at such a price, or anywhere else where the conditions were similar for the same price.

A substantial part of the value of the lands at lake Cheesman unquestionably grows out of the fact of the utility of the lands for reservoir purposes, but no additional allowance was made because of their use in connection with a domestic water supply. They were considered to be equally valuable for irrigation purposes.

Similar consideration was given to the lands at Marston Lake. It is my impression there that the added consideration, because of utility, was less than 25 per cent of the total value placed on the lands. In determining the value of water rights the valuation was strictly on an irrigation basis, although I have stated that in my judgment the use of water for domestic purposes was a higher use and should command a higher return, nevertheless the valuation was on an irrigation basis. From the viewpoint of reproduction cost it certainly is proper to refer to going concern value as the cost of reproducing the business. I think it is unquestionably true that in considering the question of going concern value we should take into consideration the contractual relations existing between the company and the city from 1894 to 1910 and the effect of their limitation upon the earning power of the company during that period. That consideration would apply to the computations dealing with

the cost to the owner of developing the business and would indicate that the computation made on the basis of earnings under the comparative plant method, should have greater weight.

I am inclined to think that weight should be given the consideration that under the terms of the contract in existence from 1894 to 1910, that the return permitted to the company during those years under the terms of the contract was a fair return by virtue of that contract.

Redirect examination by Mr. Dorsey:

I am advised that all of the pipe laid by the Citizens Water Company was not class A. pipe, some of it that has been taken out
402 of the ground has been weighed and found to be Class B pipe.

It is perhaps fair to say that 75 miles of the original 97 miles laid by the Citizens Water company is still in the ground. If that is all class A pipe I estimate that for the size of the system the difference in weight between class A and Class B would approximate 5 tons to the mile. Which for the 75 miles would make 375 tons, or a difference in price at the rate we allowed for pipe, of about $13,000. I think however that the allowance that we have made by making no additions for overweight pipe more than covers any such possible shortage in weight.

The total valuation placed upon the Lake Cheesman property was $3,400,000. It is my judgment that the property possesses that value for irrigation purposes. It is quite as much to the advantage of the public as to the advantage of the company that the contingent reserve allowance of $30,000 a year in addition to depreciation be made and such allowance should come out of gross revenue. In making our estimate of reproduction cost we assumed the use of trenching machines wherever they could be used, that is in the outlying portion of the city where the character of the soil and condition of congestion of the streets warranted. They could not be used in my judgment in the heart of the city or in the commercial district, or in the closely built up districts. I understood when I stated that the D. U. W. Co. was paying the city no compensation for the use of the streets it was not paying any stated sum of money to the city for such compensation. But of course, the company is supplying free water service in certain directions and is actually paying to the city the same compensation for the use of the streets that it has always paid since the beginning of the franchise. Also, if it were paying any stated sum, that payment would be a proper operating charge in which event operating expenses would be increased by that amount. The word, safe, in connection with the yield from water sources is used in the sense of being able to count upon the stated supply from the given source in the few years of maximum dryness that may be encountered in a century. We did not make close computations with respect to that matter because the supply was clearly prudently in advance of the need of the city, so we did not go into great detail in that matter. The total estimated safe yield from the various water sources, was 120.73 million gallons daily or about 187 second feet the year round.

By the comparative method of determining going value, I mean, broadly speaking, the cost of reproducing today the present income or business of the plant. That is in no way burdening the public with a value based upon excessive rates. In applying the comparative method I took into consideration and gave weight to the
403 fact that this plant operated in an arid region and for this reason reduced the going value below the value which I should otherwise have found. The existence or non existence of a franchise has nothing whatever to do with going value. I have included nothing for so called good will.

It is my judgment that the allowances made for engineering and contingencies in the reproduction cost of this plant are for such costs and expenses as would be incurred in the construction of such works. They were based upon experience which I have had and knowledge of what such amounts have been in other construction work. Interest during construction is also a proper charge. The allowance for engineering and contingencies by the former board of appraisal on the structures of this plant was 15 per cent. Objection overruled. Exception. Their allowance for interest during construction was about the same as ours about 8 per cent on the reproduction cost. I do not believe that the Wisconsin Railway Commission would admit that it had a settled practice of allowing 12 per cent for engineering, contingencies, superintendence, and interest during construction. It is my recollection that in some of the larger works, particularly the Milwaukee plant, a somewhat larger allowance was made. In passing upon that percentage one must take into consideration collaterally the unit prices to which it is applied and the character of the plant under consideration. The size and nature of the works, etc.

My estimate of reproduction cost is not the actual original cost, less depreciation but the present day cost of reproduction, less accrued depreciation in the actual plant.

It would make no difference in my judgment in the present value of the plant whether the going value or any part of it was created prior to the organization of the D. U. W. Co. Whether you call legal expenses operating expenses or something else it certainly is an expense that must be taken care of in the rates. The service pipes that were discussed by Senator Patterson in connection with the item, "Service repairs" in Exhibit A20 are the pipes owned by the consumers and do not relate to the distribution main, and the statement that they were approaching the end of their life did not apply to the distribution mains.

I told Senator Patterson that I would endeavor to supply him with a complete list of those service pipe repairs but I find that that can not be done, primarily because the pipes belong to the consumers, and the actual repair work is usually done by him. The company's charge to this account develops from the fact that whenever a leak is reported it sends its force to the ground to ascertain the cause. To do so an excavation must be made to determine whether the leak is in the service pipe,, the corporation cock, or the
404 main. If it is in the service pipe or the corporation cock and the expense of the repair is nominal the work is done by

the water company without any charge to the owner. If the expense is considerable involving the replacement of the service, the water company notifies the owner and may do the work for him at his expense or he may have it done by a plumber if he prefers, but the expense that the company has been put to to ascertain the cause of the trouble is borne by it. I am informed that a considerable amount of the increased expense on this account in the past few years has been in localities where storm and sanitary sewers have been constructed, the work upon those trenches having resulted in settlements that have caused a pulling out of the service pipe, causing it to leak. If the employes of the company find when the excavation is made that the leak is in the main itself the repairs are made and the cost is charged to the account, "Street repairs." Also shown in exhibit A20 under which all charges for the repairs to the distribution pipe system are entered.

I have with me the data that was requested by Senator Patterson as to the amount of the expenditures on the first Cheesman Dam, as shown by the books of the company. The expenditure for that work was $168,884.54. Some of the work included in this item went into the finished structure and was not estimated separately there. It is included in our allowance of $84,000 under the item, "preliminary and flood Expenses." So there is no duplication.

The depreciation allowance of $138,000 per annum is to take care only of the ordinary depreciation, and not calculated to take care of the loss in value that the plant would be subjected to if the city constructed a new plant. To make that loss good it would be necessary to practically double the rate in the interval between the beginning and completion of construction of the new plant. In valuing lake Cheesman we considered the special adaptability and availability of the lands as a reservoir site but added nothing because of the fact that the reservoir was devoted to a city supply. Nothing was added to any value in the plant because of that particular use. The allowance made by us for going value was just what it would be after giving due consideration to the question of limitation by contractual conditions during the franchise period that was raised by Mr. Nye. I think the Wisconsin Railway Commission since the Appleton case has allowed for pavement over mains in rating cases.

Recross-examination by Mr. Nye:

Some of the lands excluded from the valuation of the Spring Valley case were properly excluded, others were not, in my
405 judgment. Though I have accepted the dictum of the Court.

It is my view in rating cases that it is better to be liberal in the inclusions than to cut too closely what is necessary in the operation of the work, because ultimately if you are not reasonably liberal in the interpretation of what constitutes use you will have to allow a higher rate of return or have much more property to take care of in the depreciation account. I would not include

property not likely to be used in the near future in the rating base. The fact that the property is growing older has nothing to do with my estimate of the needs of a contingent reserv fund proportionately larger in the future than has been required in the past. My reason for allowing less going value in this case than I would allow in the East, is the fact that in the East we have more available alternate sources, which could be used by the individual, therefore the development of business would not be as rapid. It is true that the average age of the service pipes attached to the mains is less than the age of the mains themselves.

Redirect examination by Mr. Dorsey:

There is considerable difference between the life of the cast iron mains and service pipes. Service pipes may be assumed to have a life of from 16 to 30 years, while the shortest life assumed for mains in this system is 41 running from that up to 94 in the case of larger mains and I have no doubt that the actual life will be much longer than that. The fact that the plant is larger and constantly growing larger and spreading over more territory affects the requirement for the contingent reserve. I don't believe that we have included in this property any lands that would fall in the same category with those that were excluded in the rating base in the Spring Valley case. There may be a few lots, or something of that sort, not necessary, but the amount involved in their value would be infinitesimal as expressed in percentage as a reasonable rate of return from this plant, it might amount to $10,000.

Eliminating that small amount which would be negligible, there is no property included here which is not necessary.

Witness LEONARD METCALF recalled.

Direct examination by Mr. Dorsey:

I caused to be prepared a table at page 50, Exhibit C headed, "Reservoirs of the D. U. W. Co." the information as to drainage area, elevations, operating level, capacities and depth, were obtained from the records of the company. Data as to storage
406 per square mile of drainage area was obtained from computations. Offered and admitted. The table at page 51, Exhibit C dealing with the filter plants of the company was similarly prepared. Information was obtained from the records of the records of the company. The table shows among other things, the average output of the filters daily for the year 1913, and states "All of these filters have been and may still be operated at considerable higher rates with good efficiency" that is my note from an investigation of the filtration results obtained. Offered and admitted.

Mechanical filters are commercially rated on a basis of 125 million gallons per day per acre of filtering surface, which I have assumed here. For the slow sand filters I have assumed 2.8 million gallons per acre per day. Another table appearing on page 51, under the heading "Infiltration galleries" was similarly prepared from the

plans and records of the company. The column headed "lineal feet" refers to the length of the collecting gallery from end to end without respect to its height or cross section. Offered and admitted. The last table on page 51, of Exhibit C, headed "Water supplied from different sources by the D. U. W. Co. for the year 1913" was similarly prepared from information obtained from records of the company. The last column shows the percentage of the total supply drawn from each source. Offered and admitted. I cannot say whether less water was drawn from the Mississippi Street and Cherry Creek galleries in 1913 than formerly. That information may be furnished by the table at page 36, as to Cherry Creek. Referring to the table at page 36, apparently the draft is about the same. The information as to Mississippi St. may be obtained from pages 34-35, which indicate that the draft for the year 1913 was considerably less than heretofore. These drafts cover the flow for the entire year, whereas Mr. Anderson's testimony applied only to the summer season flow, and the galleries flow more in summer than in winter.

Cross-examination by Mr. Nye:

On pages 41-42-43 are computations showing the capacities of the clear water conduits based upon the assumption of maintaining certain levels in the distributing reservoirs. If the levels are reduced the carrying capacities of the conduits may be materially increased, except the Cherry Creek Conduit which delivers over a weir at the Capitol Hill Reservoir. During periods of heavy drafts the conduits discharge directly into the mains without carrying the water to the reservoirs at all, reducing the friction loss and increasing the rate of discharge. Much of the water which is con-
407 sumed, never reaches the reservoirs at all and the increase in draft before the water reaches the reservoirs from whatever source it originates results in an increased delivery from the clear water conduits. There is no table which shows the maximum delivery possible from those conduits. We can make such a table or your own engineers can prepare it.

In computing those conduits capacities I assumed a free discharge from the conduit into the reservoir at the water level indicated. It would make no difference whether the conduit itself discharged into the bottom of the reservoir or near the top at the level determined upon. The Cherry Creek conduit discharges at the top. The same is true at Mississippi Street. The other Capitol Hill lines and the Ashland Avenue lines, as I remember them, discharge into the bottom of the reservoir. The list of abandoned property which I have given you and which has been marked Defendant's Exhibit 14, corresponds to the list given at pages 98 to 100 Exhibit C except that in the document marked Exhibit 14, values have been extended for the several items. No part of this property was included in my total valuation of $16,038,000.

Redirect examination by Mr. Dorsey:

In the table of capacities of clear water conduits, I have assumed that all of the water indicated by those capacities would be delivered into the reservoirs at the end of the conduit line. In actual operation water is taken from the conduits before they reach the reservoir, reducing friction loss, so the capacity of the conduit is greater than that here shown. Take for example conduit No. 3 on which my estimated capacity at the reservoir ranged from 8 million to 9.7 million gallons and which the records of the company show has actually delivered 23 million gallons daily. That added delivery is accounted for by the fact that the water was taken from the conduit on the way to the reservoir, in other words a shorter distance must have been traversed by the water and the water must have been delivered at a lower level than here assumed. The capacity of the system to deliver water during periods of maximum draft is greater than the capacity of the conduits, because under those conditions water will be drawn from the reservoirs which will be replenished when the heavy draft ceases. That condition exists in Denver every day in summer. Except perhaps on rainy days when there is no draft for sprinkling purposes.

408 Recross-examination by Mr. Nye:

If any of these clear water conduits delivered three times the capacity here rated it would be under such conditions as reduced the pressure to a point where the buildings in the higher part of the zone of supply would be without water.

Redirect examination by Mr. Dorsey:

I do not remember the height in this system at which water is delivered where the pressure is furnished solely by the gravity system. The people who take water from the gravity service, take it at a point in all cases which is substantially below the level of the water in the reservoir which I have assumed in my tables.

Recross-examination by Mr. Nye:

The location of the consumer affects the discharge of the clear water conduit in respect to the draft which the consumer makes as affecting the friction and the variation of the hydraulic grade. Exhibit C. in its entirety offered and admitted, except as to one page, 49, bearing upon the testimony of Witness Goldsmith.

Witness GEORGE GRAY ANDERSON.

Direct examination by Mr. Dorsey:

I reside in Denver. Am a civil engineer. Was educated in Aberdeen, Scotland. In Robert Gordon's College, and in the University of Aberdeen. Then was apprenticed 5 years to a firm of engineers mostly engaged in water works, sewage and land drainage, includ-

ing the term of apprenticeship have been engaged in the practice of engineering 40 years. Was employed by the London & Northwestern Railway Company in London, England. In the spring of 1880, came to Colorado as assistant engineer of the Northern Colorado Irrigation Company's canal, remained with that company as assistant engineer, chief engineer, and general superintendent until 1890. The company was known locally as the English company and had large works here with which I was connected. Have since been actively connected with irrigation and water supply projects. The largest of which were in Alberta, Canada, covering about 250,000 acres of land. Built the water system for Greeley, Colo. a number of reservoirs and irrigation works on the Arkansas River and in the San Louis Valley. The last three years have been mostly in California in connection with the works of the Spring Valley Water Company and the Pacific Gas and Electric company of San Francisco. I am familiar with the water rights in the state of
409 Colorado, particularly on the South Platte River and its tributaries, as to their yield capacity and value.

I first became familiar with the property of the D. U. W. Co. about 18 years ago, since which time I have frequently been consulted by officers of the company concerning water supplies, water rights, and matters of construction. I first investigated the water rights of the company as a whole about 1907 for the purpose of preparing data and reports for the board of appraisal engaged in valuing the property which reported its findings, March 20, 1909. The investigation covered the entire water rights field with respect to the availability, reliability and the then value of the water rights of the company. The flow of the streams, and amount of water that might reasonably be relied upon from the water shed from which the rights are supplied.

Have recently made further investigations of the water rights in connection with the recent appraisal by Mr. Metcalf and myself. Am familiar with this book which is Exhibit C. I cooperated with Mr. Metcalf in the valuation of the entire property of the company and the conclusions set forth in exhibit C. represent our joint conclusions as to that value. It is also true as to the several items of reproduction cost, depreciation, and the detail of the inventories, set forth in exhibit C. I was present in court and heard and concur in the testimony given by Mr. Metcalf in respect to the investigations conducted by us and the conclusions which were reached.

I made a special study of the water rights which are referred to beginning at page 117 exhibit C. and in greater detail at pages 417-27 also pages 15-19. The effect of my investigation of the water rights at this time was to bring my previous investigation down to date. I examined particularly the statements of claim upon the water rights, the water supply from the streams and the yield available for the rights and considered their value and the changes that may have occurred in their value since my previous investigation. I then combined the various rights in groups according to the manner in which the supplies are grouped in the operation of the works. In determining the value of the rights I based my conclusions upon

their value solely for irrigation purposes as though they were separated and taken away from supplying the city of Denver with water for domestic purposes.

In effect the value assigned to the rights is the junk or wreckage value that would remain if they ceased to be used for the purposes for which they are now used. The rights possess a greater value for domestic supply purposes than for the purpose for which I have valued them. They also possess an added value for irrigation
410 purposes assembled together as they are in such a large body of rights capable of yielding a large supply. But I have considered neither that element of value nor the element of value for city supply purposes. I have simply valued them grouped together as they are today and as I find them. It would be necessary for any one coming here today to duplicate this water system, to reproduce the physical structures and the land and also to reproduce by purchase or otherwise the water rights necessary to furnish the water supply. In my opinion it would be impossible to reproduce water rights equivalent to these or adequate for the supply of the City of Denver by original appropriation. It would be necessary for anyone attempting to reproduce these works to obtain his water rights by purchase or condemnation. I never have seen so much water in the Platte River for so long a period as this year in the 34 years during which I have been familiar with it. It is more necessary for a water supply for municipal purposes to be continuous and reliable than where the supply is used for irrigation purposes. For this reason it would be impossible to obtain a supply for city purposes dependent upon flood water flowing in such an unusual year. In my judgment it would be impossible to acquire by purchase or condemnation a water supply equally as adequate and available as the supply of the D. U. W. Co. for the use of the City of Denver at the price which I have assigned to these water rights as their present irrigation value. It would cost more to obtain a reliable and adequate supply.

The supply of the Platte River is over appropriated. The appropriations having been effected by the construction of canals, reservoirs, etc., large in extent and expensive in character for the utilization of the water. If a water supply, to reproduce this water supply, was obtained by purchase or condemnation it would take it from those who are using the water through these structures with the result, if the structures could not be used in the new enterprise their value would be destroyed. A large acreage of land is irrigated by the waters of the Platte River and its tributaries through the structures mentioned and so much of this land as the water is taken from, to reproduce this supply, will at once go back to its original condition as dry land much depreciated in value. The amount of that damage I would not attempt to estimate, but it would be great. Those elements of damage to lands and structures would enter into the price that would have to be paid for the water rights by one purchasing to assemble them by purchase or condemnation. I have not taken that element into consideration in fixing the value of these lands, but have simply

put upon these rights the values which I consider are current for waters of that kind devoted to irrigation purposes. The High
411 Line Canal structures are to the south and east of Denver. I am personally familiar with the lands than can be irrigated under that system. In 1882 I personally made a complete survey of the land lying under that system from the canal northerly almost to the Cache La Poudre River and to the east to a point near Platteville. I am familiar with ditches and reservoirs through which the waters of the D. U. W. Co. might be applied to lands for irrigation purposes, and with lands to which they may be applied. There is a demand for such a water supply, sufficient to absorb the water produced by the rights of the D. U. W. Co. In valuing these water rights I have, as I stated above, divided them into groups, as I found them in the physical application to the system.

Group No. 1 listed at page 117, Exhibit C is composed of items 1-4, 13-17 and 21, to which I assigned a value of $1,150,000. These are the rights taking the supply from the Platte River at Platte Canon and from Bear Creek, combined and operating through Marston Lake. (Detail of method pursued in arriving at the valuation of the rights contained in Group No. 1.) I assumed from the rights in Group No. 1 delivered through Marston Lake an average annual supply of 38,468 acre feet which I have valued at $60 per acre foot. Making a total of $2,308,080, from which should be deducted to determine the net value of the water rights the value of the structures appurtenant thereto, amounting to $1,163,886 leaving a net value of the water rights $1,154,194 which I have rounded out at $1,150,000. The net average annual yield from the Platte Canon sources is 37,484.6 acre feet, deliverable through Marston Lake, from which I have deducted 3,909.6 acre feet for evaporation and seepage loss from Marston Lake estimated at 6 feet vertical annually, leaving a net available supply of 33,575 acre feet. The yield through the Harriman Ditch from Bear Creek I have estimated at 6,840 acre feet annual average, making a total of 40,415 acre feet from which I have deducted 1,947 acre feet from the Bear Creek supply, that according to the records would be available in the months of April and May when Marston Lake was full and before drafts commenced from the stored supply in the reservoir leaving the net amount of 38,468 acre feet upon which I have computed the value. This 1,947 acre feet however could be made available through exchange but I have not considered it in fixing the value. This estimate of yield is on the basis of 100 per cent effective delivery of the water ascertained from the records of the stream with relation to the priorities of the ditches.

It is a guaranteed supply without any question. Every element of doubt or uncertainty of the water product having been
412 eliminated from this consideration. It is not on the basis of the purchaser sharing pro rata in whatever the water rights may be capable of yielding as is the ordinary practice in handling irrigation water. The storage capacity of Marston Lake is 19,794.7 acre feet. In utilizing this quantity of water the winter flow from October to April would practically fill the reservoir. The flow for

the months of May and April would not be put into the reservoir. The flow of the South Platte would be handled either by storage in Lake Cheesman or exchanged with other ditches. That of Bear Creek might be exchanged to some extent but for the purpose of my computation I have eliminated the amount available from that stream for those two months. After the beginning of June and the beginning of the demand, the withdrawal of water from Marston Lake would be in such volume that the storage could be withdrawn and the normal flow from the Platte River and from Bear Creek would be taken through the lake and treated as stored water.

Group No. 2 shown at page 117, Exhibit C consists of items nos. 5 & 6 valued at $200,000. It is the supply from the Mississippi St. Galleries under two appropriations from which on the basis of the records from 1900 to 1913 I estimate the yield at 4,459.6 acre feet for the irrigating season and 2,092.1 acre feet for the non-irrigating season making a total of 6,551.7 acre feet for the total yield for the year. This water is practically stored water taken from the gravel beds beside the stream, a source that is constant and dependable at the season of the year when such water is required. The irrigation season flow can be taken from the conduit directly back to the river and diverted below Denver wherever desired. The non-irrigating season flow would require a storage down stream to be utilized to its full value. Having that in mind and to be conservative I have treated both the irrigating season flow and the non-irrigating season flow as requiring storage, and estimate a cost of $20 per acre foot to cover such storage, leaving a net value per acre foot for the 6,551.7 acre feet of $40 or a total value for the water of $262,068 from which is deducted the value of the plant appurtenant to the diversion of the water amounting to $72,980 leaving a net value of $189,088 which I have rounded out at $200,000.

In determining the yield from these rights I have based the quantities upon the actual quantities obtained from 1900 to 1913. That does not in my judgment represent the total amount available from this source of supply, but I have left that out of consideration in my valuation. The water diverted by these galleries is not water flowing in the surface water course of the stream. In making this de-
413 termination I did not consider the claim that the appropriation related back to Dec. 20, 1870, though the actual appropriation occurred in 1878. I followed the same plan with reference to relating back the appropriations wherever such claim is made by the water company. I think $20 an acre for storage facilities is an ample allowance. I did not make any allowance in my valuation for the power rights of the Archer Canal, the Platte and Denver Ditch, or the Rough and Ready Ditch, which in my judgment are simply protective of the quantities of water available from the rights to which values were attached.

These power rights are listed in items 20 and 21 at page 118 of Exhibit C. My purpose here has been to ascertain the value of the water rights from the viewpoint of their productiveness.

Item No. 7 Cherry Creek galleries rights, valued at $60,000. The diversion is made in the same manner as at the Mississippi street

galleries and I estimate the yield during the irrigating season as 3,424 acre feet sufficient to irrigate 2,000 acres of land to which I have applied the value of $60 per acre, a total of $120,000 from that I have deducted the value of the structures appurtenant to the diversion of the water amounting to $49,252 and I estimate that ditch construction to the amount of $10,000 would be necessary for the proper utilization of this water. This leaves a net value for the water in round numbers of $60,000. There are a number of areas of 2,000 acres to which that water can be applied.

Exhibit A 27 is a record of the stream discharge of the South Platte River at Platte Canon from April to Oct. inclusive for the years 1887-1913, with the notation as to where the records have been found. That is one of the tables to which I referred in my testimony.

Exhibit A 28 is a table showing the discharge of the South Platte River at Platte Canon for the months Nov. to March inclusive from the years 1887-1913 so far as the records show them, with notations as to where the records are obtained. Also notes as to the percentage of supply compared with its appropriation available to the Platte Canon Ditch during these months. Exhibits A27 and A28 offered and admitted. Exhibit A29 is a copy of the record of the actual delivery of water of the Mississippi Street galleries to the West Side Pumping Station of the D. U. W. Co expressed in second feet and acre feet. Information contained in Exhibit A29 taken from the records of the D. U. W. Co. It is the table to which I referred in testifying about the water available from the Mississippi Street galleries. Offered and admitted.

414 Item No. 8 in the list of water rights at page 117 Exhibit C refers to the Platte Canon filter galleries, value $64,000. The record of yield from these galleries show an average supply for the irrigation season each year of 4,178.7 acre feet and for the non-irrigating season 2,709.5 acre feet actual production.

Exhibit A30 is a table showing the quantities of water actually produced by the Platte Canon galleries for the years 1900-1913.

This water could be returned to the stream about a mile below the galleries and diverted again by ditches below or in exchange with the Highline Ditch or the winter flow occasionally diverted to Marston Lake in conjunction with the Platte Canon Ditch rights. My analysis shows that about half of the winter flow or about 1360 acre feet representing a value of about $80,000 could be so diverted. Of the summer flow 2418 acre feet available from June to Sept. could be so diverted, the value of which would be $145,080.

However, in the consideration of the value of this item I have eliminated all of the winter flow and all of the summer flow except the 2,418 acre feet available from June to Sept. inclusive. The difference between that and the total yield available of 6,888.2 acre feet being regarded as for the protection of the Platte Canon Ditch or left as available for some purpose in direct flow that might be developed. From the $145,080 is deducted the value of the structures appurtenant to the diversion of the water which would leave a net value of $63,532 rounded out as $64,000. The ignoring of this large quantity of water which is now produced and applied to a beneficial

use is illustrative of one of the reasons why these water rights are more valuable for city purposes than for irrigation. There is a continual flow and continual consumption at the present time. The intake of the High Line Ditch is about a mile above the Platte Canon works of the D. U. W. Co. There are no ditches intervening between the High Line intake and the water company intake. There are large areas under the High Line Ditch not now supplied with water or not adequately supplied that could absorb the water furnished by these rights of the D. U. W. Co. Item No. 9 on page 117 of Exhibit C is the 34 inch conduit right, separate and distinct from the Platte Canon Ditch and the Platte Canon galleries. The conduit can get a limited supply during peak flows of the stream. I have placed a value of $1000 per second foot on its appropriation of 24.75 second feet taking into consideration the fact that it is behind the High Line Ditch the rights of which are valued at $1250 per second foot. Ordinarily this conduit is used by the water company to carry the Platte Canon Ditch appropriations. The value given here is solely upon its own appropriation dating from the year 1892.

415 Item No. 10 40 inch conduit water right valued $30,000 is in all respects the same as item No. 9 except somewhat later in date. For this reason I have reduced its unit value from $1000 to $800 per second foot, which upon 38.08 second feet makes $30,465 rounded out as $30,000. The value is based upon the value of the rights in the High Line Ditch scaled down for the later appropriation which dates from May 1899.

Whenever there is water enough to supply the High Line Ditch there usually is water enough to supply items Nos. 9 and 10. Item No. 11, page 117, Exhibit C is a right for 50 acres in the High Line Ditch, market value $1250.

Item 12. Lake Cheesman, Value $2,000,000. Explanatory on this item I have prepared a number of tables showing the stream flow at Platte Canon and at Lake Cheesman from 1900-1913, the estimated available storage each year and the effect of a draft upon the reservoir of 60,000 acre feet per annum for irrigation purposes. These tables show that from 1899-1914 a total storage, less evaporation could have been accomplished of 912,251 acre feet or an average of 57,016 acre feet per year, based upon the provision of the decree for the reservoir which gives it the right to fill to its maximum capacity once a year if water is available. Exhibit A31 shows by years the storage accomplishment just mentioned. The capacity of Lake Cheesman is 79,064. acre feet. I assumed an annual draft upon the reservoir of 60,000 acre feet. In the ordinary operation of the reservoir that draft would not be called for in normal years, because the rainfall would in part take care of the needs of the lands under the reservoir. I have ignored this fact in my consideration however, and have treated as though 60,000 acre feet were drawn out each year, thus resolving the doubt, if any existed against the reservoir, by subjecting it to the severest test possible. Exhibit A32 shows the stream flow at Platte Canon, and Lake Cheesman, and the amounts in second feet and acre feet available for storage in Lake Cheesman,

the evaporation and total storage in acre feet from 1900-1913. Tables are compiled and computed from official records.

The last column in the tables show- the quantity of water in storage at the first of each month. These tables are supplemental to and supply in greater detail the information contained in exhibit A31. Exhibit A33 is a table showing the flow of the South Platte River at Platte Canon for 1899. Exhibit A31, A32 and A33 offered and admitted. There is no record of stream flow at Lake Cheesman for 1899 but comparing the stream flow at Platte Canon for that year and with other years for which there is record at Lake Chees-
416 man I am satisfied that the reservoir could have been filled to its full capacity in that year.

Ignoring the year 1899 there would be available in the 15 years 1900-1914 inclusive an average supply of 54,397 acre feet per annum or an average annual delivery of 90.66 per cent of the full supply of 60,000 acre feet. There would be excesses in the stream flow in some of the years to allow storage above the maximum capacity in those years so I have taken the result from the table including the year 1899 of 57,016 acre feet as the average safe annual delivery from the reservoir. In my judgment that is a safe assumption based upon the records and my familiarity with the streams themselves and the reservoir. The storage decree of Lake Cheesman is relatively early. There are a great many storage appropriations on the Platte River later than Lake Cheesman. Assuming a safe annual delivery of 57,016 acre feet the value of the reservoir at $60 per acre foot is $3,420,960, at that value the maximum capacity of the lake 79,064 acre feet is worth $43.27 per acre foot. From the gross value stated I have deducted for the structures and lands at Lake Cheesman a total of $1,426,727, leaving a net value of water rights of $1,994,233, rounded out to $2,000,000. $60 per acre foot is a fair and reasonable price for that water for irrigation purposes. The usual method of selling reservoir water rights is on the basis of maximum capacity, the buyer buys space in the reservoir and takes his pro rata share of the water obtained. My estimate of value is based upon the average reliable annual supply. In the period of 16 years there are some deficits below the 60,000 acre foot basis, but the 91 per cent efficiency over the whole period would be and is regarded by irrigationists as practically 100 per cent efficiency particularly as one of those years was the lowest in stream flow recorded in the country.

I know of no reservoir in Colorado, which has such a record of safe delivery particularly where application is made of the continuous draft for the full amount each year. No additional structures are necessary to make this water available for irrigation. The water can be turned down the river and diverted by ditches already constructed. In my judgment there is a ready market for all of that water.

Item No. 13 page 117. Exhibit C. Harriman Ditch company's shares of stock. Water available is included in Item No. 1. Item No. 14. Soda Lakes Reservoir and Mineral Water Company shares of stock yielding 440 acre feet at $60 per acre foot makes the water

value $26,400, represented by 110 shares of said stock having a market value of about $250 a share makes the stock value $27,500, which checks with the water value.

417 Item No. 18, 72 shares of stock in the Bergen Ditch and Reservoir Company valued at $30 an acre foot for 360 acre feet. $10,800. Excluded from the total value of water rights because it is for irrigation purposes exclusively. Item No. 19 Harriman Reservoir valued at $32,000 net also excluded from the total water right value because it is used for irrigation.

The fact that I included no value for the Archer Lake power rights in my valuation for water rights for irrigation purposes does not mean that that right possesses no value as at present used for power in connection with the water supply of the city of Denver. The rights of way, lands, and apparatus at the pumping station used to apply this power right are included and properly included in our valuation of physical property and in the rating base. I have treated the power rights of the Rough and Ready Ditch furnishing the Littleton Mill with power in the same manner as the Lake Archer rights and for like reason. Also the Platte & Denver Ditch rights. The next item on page 118, Exhibit C is a 20 acre water right in the High Line Ditch used for irrigation and valued at 500 dollars, excluded from the total water right value.

The total value for water rights that I have included in the rating base is $3,530,000. That is the total aggregate value arrived at by me through the processes described and is the value of the water rights for irrigation purposes. It includes only the water rights which are made use of for the city water supply. The price of $60 per acre foot is the fair value of the water rights exclusive of the cost of maintenance that may occur after their purchase, that is the plan upon which water rights ordinarily are bought and sold. The maintenance cost on Lake Cheesman would be much less than the usual maintenance cost on reservoirs because of the superior construction. That would make the water rights more desirable and more valuable.

The Platte Canon ranches were included in our valuation of $16,000,000. Through possession of these ranches the company is at all times able to make full use of the water available under its water rights and protect itself against the claim of abandonment by non use. We have placed a value on the reservoir lands considerably in excess of the value of surrounding acreage because in my experience the acquiring of lands for such purposes has invariably cost much more than the normal agricultural value of the land. The Lake Cheesman lands are particularly valuable as a reservoir site. That is also true of the Marston Lake lands.

Valuation allowed for lands is unimportant however because the reservoirs were valued as entities including water, land and
418 structures. So if the land value were reduced the water value would be increased to the extent of that reduction. I prepared the tables on page 13, of Exhibit C under the heading "Safe yield of water sources for irrigation purposes." In that table the yield from Lake Cheesman is stated at 71,315 acre feet per annum.

That takes into consideration the excess water which I stated in my testimony concerning Lake Cheesman was available over and above the rights to store the capacity of the reservoir. The table shows the yield from Cherry Creek as 5800 acre feet. That is the whole year's supply. I valued only the irrigation seasons supply of 3424 acre feet. Table offered and admitted. I prepared the table on page 14, of Exhibit C headed "Sources of water supply". The statistical data is obtained from the records of the D. U. W. Co. Table offered and admitted. Pages 24-29 Exhibit C contain tables of run-off and stream flow records. The figures of monthly mean discharges found in those tables are the figures I employed in my estimate.

At pages 30-36 Exhibit C are tables showing draft of water from various sources by the D. U. W. Co. They are the tables upon which are based my conclusions as to the safe yield from these various sources.

Cross-examination by Mr. Nye:

I meant by bringing my investigations down to date that I brought down to date the records of stream flow and estimates of yield of the water rights that I had used up to the date of the other appraisal. In making this valuation I started from the very beginning and worked each right out separately. I applied the second foot basis of value in the cases of the 34 and 40 inch conduits and the High Line Ditch. I applied the acre foot value to the other rights because they were reservoir rights or rights of like character that could be relied upon for 100 per cent efficiency when wanted. I considered the irrigation season to be from April 1, to November 1. That period is not fixed legally except that it is designated as the time during which ditch corporations may be called upon to furnish water. I have examined the reports of the commissioners and they show that April begins and October ends, practically the irrigation season draft. I testified and made affidavit before the board of appraisers as to the value of the property of the D. U. W. Co. in 1909 and placed a value on the water rights of the company of $4,879,000 from which was to be deducted structures. I did not value the water rights separately from the structures. The valuation placed by me on Lake Cheesman at that time was $3,500,000. The month of June is the month of maximum demand for water. Ordi-
419 narily stored water is required in the month of June. Ordinarily water is not available for storage in the month of June. There are years when there is an excess of water in that month. I used the records of the State Engineer's office pertaining to the demands upon the stream as a basis for my testimony. The assembly of water rights and the reliability of supply give an added value to the rights under consideration for irrigation purposes. I took that into consideration in fixing my price of $60 per acre foot.

The considerations go together, hand in hand, based partly upon the character of the service and partly upon the large volume of that character assembled in one mass. The larger volume and larger areas to be supplied may increase the difficulties of application of the supply but the first requisite is the difficulty of finding so large a

body of water for so large a body of land. The combination of direct flow rights of early priorities backed by large storage rights enable you to assure the consumer of his 100 per cent supply at all times. I contemplated using the water stored from the direct flow rights in the same season. The Mississippi Street rights are treated as capable of being stored because their use has been developed for the year round. There are numerous reservoirs down stream where these rights can be stored. If the city in obtaining a new water supply acquired water rights by purchase or condemnation it would pay not only for the water but for the value of the structures and lands damaged by the taking of that water. So that if any of these structures were never thereafter used they would necessarily be paid for. After this water was taken from such lands and structures and the entity compensated for they might be used in absorbing the present water supply of the D. U. W. Co. That would be a question of a development of trade, however. There are other structures in existence now without an adequate water supply through which this water could be put to a beneficial use.

There is plenty of land that can be irrigated from the High Line Canal and extensions thereof to absorb all of the water supply of the D. U. W. Co. and which is capable of standing the cost of $60 per acre and more. I think you could find plenty of ready markets for the water from the Mississippi street galleries at the price fixed and more. The city could not obtain the winter flow of water through the purchase of irrigation rights because the rights of the D. U. W. Co. now absorb the stream flow during the winter season. That right of the water company has been established for any use that it may make of it as I see it. I testified that in determining the value of these water rights I did so on the basis of water product, and
420 did not regard the claim of relation of priorities back to 1870.

There are 93½ feet of appropriations out of the Platte River prior to the last appropriation of the Platte Canon Ditch (List of said appropriations).

The first appropriation of the Platte Canon was July 30, 1861. 4.7 second feet.

Second appropriation Dec. 30, 1863, 34 second feet. Third appropriation Dec. 30, 1864, 17.3 second feet. Deducting for the short capacities of some of the prior ditches there remains 74.1 second feet ahead of the three appropriations of the Platte Canon Ditch, or a necessity of 130 second feet in the stream before the Platte Canon Ditch can obtain its full appropriation. During the non-irrigating season the records show that the Platte Canon Ditch could obtain 96.4 per cent of its appropriation of 56 second feet. In my calculations I have further reduced that figure to 88.07 per cent. This was due to my calculations of storage for Lake Cheesman.

I only valued the net product of the Platte Canon Ditch after making this deduction. As a matter of fact so far as total value is concerned it made no difference whether I stored that water in lake Cheesman or Marston Lake. However, Lake Cheesman is valued on the assumption that during the winter season all of the flow there is stored in the lake, so if I value that amount at Lake

Cheesman I must take it from the Platte Canon Ditch. If I don't store it at Lake Cheesman then it comes down to the Platte Canon Ditch and I value it there. The surface area of Lake Cheesman is 874 acres, Marston lake 651.6 acres. In determining the amount of water available from the winter flow of the Platte Canon Ditch I took the period from November 1 to March 31. And the supply 14,771.5 acre feet. The 37,484.6 acre feet from the Platte Canon ditch was a full year's supply. The figures from Bear creek 6840 acre feet was a full year's supply. I treated these rights as a group serving Marston Lake.

I made no additional allowance in value for exchange water. I pointed out that 1940 acre feet from Bear creek could be exchanged but I did not value it at all. It could be *sorted* in Marston Lake if the reservoir had a greater capacity. I do not consider merely running water through the lake as storing of that water. But in effect it is storing. You pass the water through the lake during June, July, Aug. and Sept. at the time of maximum demand. In effect it is stored water because you can draw it at any time. If the demand fluctuates it piles up in the reservoir until the day it is needed. simply using the reservoir as an equalizer.

I assumed that the right to store that water in Marston Lake in the non-irrigating season has matured by the continued
421 use for beneficial purposes of the rights of Platte Canon Ditch and from Bear Creek. That would not be true of any other water supply than the D. U. W. Co. because its rights absorb the winter flow of the South Platte river and no other ditch can get it. Not even the city and its inhabitants, because the Platte Canon Ditch right has matured and become a vested right against the river for that time. I do not understand that any of the claims of the D. U. W. Co. to an all year round use have been decreed but understand that they are now pending in court.

On the Cherry Creek galleries I allowed 3424 acre feet for the summer season. I limited it to the irrigating season because there was no immediately available storage that I knew of. I took into consideration the appropriations prior to both the Cherry Creek and Mississippi Street supplies but made my valuation solely upon the yield. I assumed that these yields were in no manner interfered with by priorities. In making the valuations I assumed always that the water rights claimed by the D. U. W. Co. were owned by them. And also assumed that the existing right was an all year round use and could now be changed and made as available and effective for a yield of water for irrigation use as they are now made effective for a domestic use. I made no separate valuation for Lake Archer Power right. I made an investigation of how much pumping was done by the power water.

I assumed a different value and a different duty for the Cherry Creek galleries water than for the other rights because of the difference of delivery. It is a continuous flow that might be too much at one portion of the season and too little at another. I took the record of stream flow at Platte Canon for 1900 and 1901 from the High Line Ditch Measurements because they are the only records obtain-

able. There are no records of the winter flow at Platte canon from 1887 to 1895, 1899 and 1900 also are missing, because there are no records. The records from 1902-1908 are from observations by the D. U. W. Co. at Platte Canon corrected for storage at Lake Cheesman. In determining the gross flow at Platte Canon I treated the records as though Lake Cheesman did not exist. I made no effort to assume anything for the years where we have no record, that would be pure imagination. I would not say that the Mississippi Street galleries are operated to their practical capacity. I have simply taken the record as shown without expressing any opinion. I think the yield from Cherry creek could be enlarged.

I think my estimate that Lake Cheesman could have been filled in 1899 is a well founded estimate. It is based on the stream flow at Platte Canon for the year next preceding the Cheesman record. The tabulations of storage for the years preceding the completion of Cheesman Dam are to some extent simply tabulations of what might have been done if the Dam had been theretofore completed. In other respects they are actually what was done in the way of storage.

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There was not very much actual storage until 1904. There is no line of demarcation in the exhibit which will indicate where actual storage commenced and theoretical storage quit. It is not contended that the reservoir in practice has been drawn on in any one year for 60,000 acre feet. In making my valuation I did not figure on the duty of water at all. I was valuing upon the basis of the acre foot. I considered the supply particularly as a supplemental supply deliverable in the latter part of the irrigation season rather than as complete supply. The value is predicated partly upon this theory of supplemental supply and partly upon the fact that Standley Lake and Antero and similar projects obtain a ruling price of about $50 an acre foot maximum capacity of the reservoir in which the purchaser takes his chance on the yield which from my experience in the northern part of the state runs anywhere from 60 to 70 per cent. So that the real value on delivery is $75 to $80 per acre foot. There are large acreages dependent now upon inadequate direct flow rights that could be expected to buy an additional right at the rate of $60 per acre foot to give them a full and adequate supply. If the supply of the D. U. W. Co. was used for a complete supply I would put the duty at about 1½ acre feet which would make the water right cost $90 per acre of land. In my judgment the lands in the immediate vicinity of Denver which could be served by this supply could well afford to pay $100 an acre for such an adequate and abundant supply.

In reducing the draft of the priorities ahead of the Platte Canon Ditch I made the deduction because that was all the water that those ditches had diverted for a number of years. If in the future they should demand more water it is balanced anyway by the fact that I have taken no notice of accretions to the stream below the Platte Canon Ditch, which would more than equalize.

If the High Line Ditch had water 214 days in the year one second foot valued at $1250 would produce 428 acre feet making

the acre foot value practically $3. There are records of the High Line getting water only 30 days in the irrigating season. It is in no sense a dependable supply. I assumed that as in all reservoir projects the consumer bore the expense and loss in transit. The supply is guaranteed at the reservoir. The use of water in Denver
for the year 1913 was at the rate of approximately 70 cubic
423 feet per second and in 1910, 75 cubic feet per second.

Lake Cheesman is entitled to store every year if the water is available 79,064 acre feet regardless of how many times it partly fills and partly empties to accomplish it. And in years of excessive stream flow after having once filled it could store more if the right of junior reservoirs were satisfied. The estimated irrigation yield of the rights of the D. U. W. Co. upon which my valuation was based is 111,736 acre feet per annum. Approximately 122 million-gallons daily.

The safe yield for domestic purposes may average as great but you could not afford to maintain the same steady draft. 102 million gallons daily safe domestic draft is 153 second feet, or twice the daily supply furnished in 1910 which was the year of the greatest demand. In actual practice the High Line Ditch never draws its full appropriation. 1184 sec. feet. Its actual capacity is about 600 second feet. I believe it has drawn that much. If the Rough and Ready Ditch were in adverse ownership it could in winter interfere seriously with the rights of the Platte Canon Ditch. In making our final determination of values for rate making purposes we referred to original costs where we could find them. We did not take such costs into consideration in connection with the purchase of water and land, or water rights. We did to a certain extent as to the Lake Cheesman lands. We also took into consideration that in some of the later purchases of land at Marston Lake as much as $200 an acre had been paid. I think going concern value is a proper item to be added as part of the valuation for rate making purposes. I think the items of paving and service connections also are proper items. I don't think that the fact that the company has made a profit on the establishment of those corporation cocks would affect the principle. The $60 per acre foot value on the Lake Cheesman water rights includes water, land, structures, and the entire property. The $60 per acre foot is the value of the water on the market and from that is to be deducted the cost of developing it. The supply of 57,016 acre feet at $60 per acre foot produces a total value of $3,423,960 but in order to get that value you must invest $1,426,000 in the structures for its diversion and storage. The value of that water is not to be based upon a cubic foot per second rate like a direct supply spread over the whole irrigation season, because its value inheres in its ability to be delivered at the critical season of the year in large quantities.

Redirect examination by Mr. Dorsey:

The irrigating season as applied in the practice of irrigators ordinarily extends from the 1st of April to the 1st of November.
424 The non-irrigating season from November 1st, of one year, to April 1st following. I do not think there is any useful

purpose to which water could be applied for direct irrigation of crops between November 1st and April 1st. I considered the assembled value of these water rights because of the unusual volume assembled and the fact that there was immediate ample market for it and irrigation purposes. I added nothing to the unit price per acre foot on that account. I added nothing to the unit price because of my belief that it would be impossible to assemble another such body of water rights at that price.

The intake of the Platte Conan Ditch is above the intakes of all of the prior rights in District No. 8. The farthest of the prior rights below is about 12 miles. Part of the supply of these prior rights is made up from accretions to the stream below Platte Canon. Handling the water supplies of group No. 1. through Marston Lake in the manner outlined is equivalent practically to filling the reservoir twice each year. Though as a matter of fact there is but one storage filling and the direct flow rights simply use the reservoir as a channel through which they are applied to the irrigation of crops during the same season. The intakes of the water company's conduits are immediately adjacent to the Platte Canon Ditch. The water rights of that ditch used for domestic purposes are now diverted through those conduits.

The Cherry Creek galleries are under the jurisdiction of the water commissioner who is under the general supervision of the State engineer. The water rights of the D. U. W. Co. are available at the proper season for a supplemental supply. I considered this in assigning the value. The safe yield of water rights for domestic purposes is much less in quantity than the safe yield for irrigation purposes. Because in furnishing a domestic supply it is not safe to draw your stored reserve down as low as in the case of an irrigation supply. The acreage originally planned to be irrigated under the High Line Ditch was about 85,000. My last information is that there are about 20 to 25 thousand acres cultivated under the system. If the water supply were now made adequate it would induce the cultivation of the remaining land.

The present day value of the property of the D. U. W. Co. is about $16,000,000.

Recross-examination by Mr. Nye:

The only means of measurement of the water supply from the Cherry Creek and Miss. St. galleries is at the Capitol Hill Reservoir and at the West Denver reservoir.

425 It is my personal opinion that a direct flow right is limited to the season of growing crops, which is particularly stated as from April 1, to November 1. The Bergen Ditch is not included in the valuation of the plant. Harriman Lake structures are included but not the water right. Sullivan Reservoir is included. It is not in use. The strong Reservoir site is included. It is not in use. The Archer lake lands are included but the power right is given no separate value. It is reflected in the valuation of the other water rights, of which it is protective. The pumps at Platte Canon are included in the valuation. They have been used occasionally.

I think the valuation on this property that is not used but may be useful in the future, and the valuation on the property occasionally used is properly included in the rating base. The water power pumps at West Denver are included because they are used and useful.

Redirect examination by Mr. Dorsey:

No considerable amount of property not now actually used for the purpose of water supply is included in the rating base and none which I do not think will be useful in the reasonably near future.

Harriman Lake has some influence upon the water supply of the D. U. W. Co. for domestic purposes being filled first through Harriman Ditch from Bear Creek, it thereby leaves the ditch free through the rest of the season to furnish the water for city use. About 35 per cent of the water pumped at the West Denver station during the past several years has been pumped by the water power pumps.

Recross-examination by Mr. Nye:

The abandoned property listed at pages 99-100 in Exhibit C. is not included in the rating base. I include such property in the rating base as will be useful in the near future because I believe it is advisable to acquire such property reasonably well in advance of its need.

Witness GEORGE W. SKOULAND.

Direct examination by Mr. Dorsey:

Am assistant to the President and to the Chairman of the Board of Directors of the D. U. W. Co. Been in the service of the company 5½ years. Am familiar with the company's plant and methods of operation. Conduits Nos. 1 and 3 delivering water to Ashland Avenue Reservoir, discharge into wells at the bottom of the
426 reservoir and directly against its head, except to the extent that water is withdrawn from the conduits through a large number of connections before they reach the reservoir. Conduits Nos. 2, 5 and 6, discharge into the Capitol Hill Reservoir over weirs located approximately at the high water level of the reservoirs, except to the extent that water is withdrawn from conduits 2 and 6 through a large number of connections before it reaches the reservoir. Conduit No. 5, discharges directly into the reservoir at all times with no connections to the system. Conduit No. 4 discharges into the West Denver reservoir constantly over a weir at high water level. The assumed high water level at the Capitol Hill Reservoir is at elevation 233 feet. The assumed high water level at Ashland reservoir is at contour 247. The discharge level would vary in the Ashland Ave. reservoir with the head of water in storage. While the discharge level at Capitol Hill reservoir is constant, determined by the weirs.

Practically the high point of the gravity service on the Capitol Hill side is at elevation 120, exceeding that a few feet in certain sections where it is not practical to pipe exactly to the contour. The

elevation of full reservoir at Capitol Hill is 223 feet above city datum which leaves roughly speaking 103 feet head of water on the head of service. If the reservoir be drawn down to the bottom the head would be approximately 80 feet. The high point of the Ashland Ave. gravity service is practically at contour 140. High water in the reservoir is approximately elevation 247. Roughly speaking the head on the gravity service with the reservoir full is 107 feet, and when drawn down to the bottom about 89 or 90 feet.

That head would be available above the high point of the gravity services less frictional loss between the reservoir and point of delivery. Drawing the water down to the bottom of the reservoir simply reduces the pressure at the point of delivery. I have examined the books of record of the D. U. W. Co. and its predecessors to ascertain the conditions under which water has been furnished the consumers in the city of Denver. Exhibit A.34 consisting of 14 sheets contains the license forms used by the various companies from 1872 to date. Offered and admitted. I have also examined the records to ascertain the rules and regulations promulgated by these companies and referred to in the licenses. Exhibit A.35 is a copy of the rules and regulations of the D. U. W. Co. This copy was published in 1898. The same rules have been — effect since the organization of the company. Offered and admitted. Exhibit A.36 contains copies of two sets of rules promulgated by the Denver Water Company. One published in 1887, the other published in 1890. There is a slight difference in one paragraph. Offered and admitted.

427 Exhibit A.37 is a copy of the rules and regulations of the Beaver Brook Water Company and the Mountain Water Company. Date of publication not given. Offered and admitted.

I have made an investigation to determine what portion of the water supply of the D. U. W. Co. measured as part of the total supply furnished by the company is used by consumers outside of the City and County of Denver. From the record of tap openings to consumers' services I ascertained the extent of the openings through which water is delivered for various purposes within and without the city limits, and the relationship between the area of the taps outside and the taps inside of the city limits. I found that 3.8 per cent of the total tap area of the system is located outside of the city limits. In this computation, I considered only the openings to domestic consumers, exclusive of fire hydrant openings. Had the fire hydrant openings been considered there would be less than ½ of one per cent of the total tap area outside of the city. I also investigated to ascertain the percentage of the gross revenue derived from consumers, for water furnished inside and outside the city limits. 2.06 per cent of the total revenue is derived from consumers outside of the city limits. The water company now and for a long term of years past has furnished large quantities of water free to the city of Denver. It does not now nor has it in the past furnished free water outside of the city. I was connected with the company in May 1910. Exhibit A.38 is a copy of a proposed franchise submitted to be voted upon at the City election in May 1910. It was defeated. Exhibit A.38 offered and rejected. At the same election Section 264A of the

city charter was voted upon and adopted. Exhibit A.39 is a copy of a letter to the D. U. W. Co. from the Public Utilities Commission making tender of payment of $7,000,000 for the property of the company as provided for under Section 264A. of the charter. Offered and admitted. Exhibit A.40 is a copy of a letter from the D. U. W. Co. to the Public Utilities Commission declining the tender of $7,000,000 made in Exhibit A.39. Offered and admitted.

Exhibit A.41 is a copy of a letter dated June 25, 1910 from the Public Utilities commission to the D. U. W. Co. asking for certain information concerning the plant of the company. Offered and admitted.

Exhibit A.42 is a copy of the answer of the D. U. W. Co. to the letter of the Public Utilities Commission which is Exhibit A.41. Exhibit A.42 offered and admitted. The Public Utilities Commission did not avail itself of the offer of the company contained in exhibit A.42 relative to an inspection of the company's plant. Exhibit A.43 offered and admitted. Exhibit A.44 is a copy of a letter dated July 25, 1910 from the D. U. W. Co. to the Public
428 Utilities Commission offering under certain conditions to allow Hiram Phillips, consulting engineer, to make an inspection of the plant. Neither Mr. Phillips nor the commission acting through him took advantage of the offer. There was an election on September 6, 1910 at which was submitted the question of issuing $8,000,000 of bonds under the terms expressed in Section 264-*a* of the Charter. Prior to the election Mr. Phillips and Mr. Fellows visited certain parts of the plant and looked them over briefly. They did not have access to any records or plans. There was no further communication concerning this matter with officials of the company. Had there been I think I would have known about it.

Prior to the bond election in Sept. 1910 application for an injunction to restrain the election was made in the United States District Court, by the trustee under the company's mortgage. That is the litigation finally terminated by the decision of the Supreme Court of the United States in May 1913. The suit was instituted about Sept. 2, or 3, 1910. The court declined to enjoin the holding of the election but after the election enjoined the issue of the bonds. Up to the time of the injunction no examination of the plant of the company had been made by or on behalf of the Utilities Commission. Nor was any such examination made up to May 1913 when the decision of the Supreme Court of the United States was announced, except as different members of the Utilities commission appeared on different parts of the plant at different times but no detailed examination was made, nor did they in that period have access to the engineering records of the company. Exhibit A.45 is a pamphlet containing copies of a number of letters which passed between the D. U. W. Co. and the Public Utilities Commission on the respective dates indicated. Exhibits A.44, and A.45 offered and admitted. Exhibit A. 46 is a copy of a letter dated July 26, 1913, from the Public Utilities commission to the D. U. W. Co. requesting to know by what right the company was charging the rates embodied in the leaflet schedule. Offered and admitted. Exhibit A.47 is a copy of the

company's reply to exhibit A.46 in which was included a copy of the leaflet schedule of rates, the schedule under which the company is now operating, and offered to give the commission access to its property and income records to enable it to determine the fairness of the then existing rates. The Public Utilities Commission did not as a reslt of that tender avail itself of the offer of the company. Exhibit A. 47 offered and admitted. About two weeks prior to the receipt of that letter the Utilities Commission appointed a committee of engineers, consisting of Mr. Fellows, Mr. Van Diest and Mr. Allen,
to make a valuation and report on the property of the com-
429 pany. The committee continued its work through the fall of 1913 and made its report in Jan. 1914 as referred and quoted from in the bill of complaint of this case. Exhibit A. 48 is a copy of a proposal for a contract between the City and County of Denver and the D. U. W. Co. prepared and submitted by the Retail Association of the Chamber of Commerce and voted upon and defeated Feb. 17, 1914. The proposal was made public sometime in December 1913. Exhibit A. 48 offered and admitted. I am familiar with ordinance No. 26 series of 1914 of the City and County of Denver, by which the attempted reduction of rates is made which is in litigation in this suit. It came to a city council by virtue of the initiative provisions of the charter. Our first knowledge of the circulation of petitions for the initiation of the ordinance was about Jan. 16, 1914.

The petition was filed with the city clerk Feb. 9, 1914. It contained 5, 593 names. In conformity with the provisions of the charter the Elections Commission certified that the petitions were proper in form and contained the requisite number of signatures. The ordinance was introduced in the Council Feb. 24, 1914, published the first time in the Denver Times, March 2, 1914, passed by the Council and signed by the Mayor, March 3d. No hearings were held by the Council in respect to the ordinance. The D. U. W. Co. was not notified by the Council of the pendency of the ordinance or invited to be present in respect to the matter.

I was present at the session of the Council at which the bill was considered. The only discussion was to the effect that it was obligatory upon the Council to either pass the ordinance or refer it to a vote of the people. There was no discussion of the merits or demerits of the proposition. Neither the Public Utilities Commission nor the City of Denver has availed itself of any of the offers of the company for the sale of its plant or for any arrangement with the company for a definite status in respect to service.

Cross-examination by Mr. Nye:

The suit for injunction brought by the trustee to restrain the bond issue was with the knowledge of the D. U. W. Co. and none of its officials objected to its being brought. The water company refused until the decision of the Supreme Court of the United States in 1913 to recognize the Public Utilities Commission as an official body. And sought to prevent the commission from so acting to the extent that the legal proceedings had that purpose in view. The injunction restrained the commission from taking such action. The

Utilities Commission through the commission of engineers
430 availed itself of the offers of the D. U. W. Co. to permit examination of its property books and records. Exhibit A48 known as the retail plan was not prepared by the water company or at its instigation The company had to do with it after the plan was pretty well along and a committee of the Retail Association sought to consult with them about it.

The water company agreed, if it was adopted, to accept and operate under it. The plan as submitted contained both the suggestions of this committee and the water company to the extent that the opposite sides were willing to accept the suggestions of the other. After the plan was first submitted, officers of the Retail Association requested the water company to agree to modification of it, which it did.

While the plan was being considered the Water company published or caused to be published in the public press, certain advertisements in connection with it. Defendant's exhibits 15 and 16 are two advertisements either published by or paid for by the D. U. W. Co.

Redirect examination by Mr. Dorsey:

My understanding was that the injunction restrained the Public Utilities Commission from taking any action toward the construction of a new plant and I always assumed that they covered all material points relating to the duties of the commission, as against interfering with the enjoyment of the rights of the D. U. W. Co. under ordinance No. 44 of 1890. The modifications in the Retail plan were made at the request of the Retail Association, and the Tax Payers Association which joined the Retail Association in the request. Correspondence passed between the company and the associations in respect to these modifications.

Exhibits A49 and A50 are letters from these associations to the D. U. W. Co. relating to these modifications. Exhibits A49 and A50 offered and rejected. Exception. Exhibit A51 is a copy of the reply of the D. U. W. Co. to Exhibits A49 and A50 agreeing to the acceptance of the suggested changes and modifications in the retail plan. It is a copy of the advertisement identified by me as Defendants Exhibit No. 15. Objection By Mr. Nye to the admission of Exhibits A49, A50, A51, withdrawn and exhibits admitted.

The advertisement identified as Exhibit 16 was not prepared or inserted by the D. U. W. Co. It was prepared by the advertising department of the retail association and states at the top "The Retail Association is solely responsible for the statements made in this advertisement."

431 Recross-examination by Mr. Nye:

The D. U. W. Co. did not know of this advertisement until after it was published. It had no opportunity to approve or disapprove of it until after publication. It disapproved of part of the advertisements that were published. I don't know that this particular one was ever considered. It was never publicly repudiated. The D. U. W. Co. paid for its publication.

The Retail Association had no agreement or undertsanding with the water company as to what it would publish or not publish. The company announced publicly at the beginning of the campaign that it would defray the expenses of the campaign.

Witness GEO. W. SKOULAND Recalled.

Direct examination by Mr. Dorsey:

The relations between the water consumers and the company are initiated by written application of the consumers for service, in which he sets forth the location of the premises, character of service to be rendered and such particulars as are necessary for the purpose of the records of the company. That has been the practice during the life of all the companies that have operated in Denver. Exhibit A61 is the application form used by the D. U. W. Co. and furnished to prospective consumers as the form upon which their application is made. Attached to it is a plumbers application for the service attachment. It is the form that has been used by the D. U. W. Co. since 1894. No attachment by private consumers is permitted without the signing and filing of such an application. The companies operating prior to the D. U. W. Co. required a similar application. There is no substantial difference between this and the forms used by the old companies. Exhibit A61 offered and admitted. On November 1, 1913, there were 44,280 consumers services attached to the system. Of that number 4,790 were turned off because of vacancy or listed upon the company's records as partial vacancies. Today there are 44,723 consumers' services connected with the system and of that number 6,749 are either turned off or partially vacant, an increase in vacancies of roughly speaking of 2,000 over Nov. 1, 1913. The net decrease in the number of consumers served today from the number served Nov. 1, 1913 is approximately 1550. Today means Aug. 31, 1914. For the season beginning May 1, 1914, our total revenues to date are $639,517.50. For the same period in 1913, the revenue from similar sources was $734,634.26 or roughly speaking $65,000 more for the same period this year. This revenue is based upon the leaflet schedule.
432 Reductions have occurred in the revenue on all items except hydrant rentals, miscellaneous revenue and water furnished through meters.

From my knowledge of the company's business It is my judgment that the gross earnings for the year beginning May 1, 1914 and ending Oct. 31, 1913. As / nearly as I can estimate the company be less than the gross revenue for the fiscal year ending Oct. 31, 1913. The taxes of the company will increase for the twelve months May 1, 1914, to April 30, 1915, over the taxes for the fiscal year ending Oct. 31, 1913. As nearly as I can estimate the company will be called upon during that year to pay as much as $120,000 for taxes. It is part of my duty to look after the tax matters of the company.

Cross-examination by Mr. Nye:

The application form Exhibit A61, is the record of the initiation of the relation between the company and the consumer. Whether the business of the consumer was solicited or came voluntarily I do not know, so far as the earlier companies are concerned. The D. U. W. Co. has not solicited business since my connection with it. There is nothing in the record to indicate that it has solicited business or carried on a publicity campaign, calculated to induce people to connect with its system.

It has not done so since my connection with the company. In the past there has been more or less discussion in the public press on the part of physicians and chemists of the question of pollution of surface water in wells and urging the people in sections of the city so supplied to give up that mode of supply and obtain their water from the company. I don't know whether that was at the instigation of the company or not. It was before my connection with. There is nothing in the published articles to indicate who instigated them or what the conditions were or who paid the expenses. There have been many attacks in the form of a campaign against the supply of the D. U. W. Co. as a pure and satisfactory water supply. I have made no inquiries to ascertain whether those attacks through the press have caused any diminution in the number of consumers. The number of services that I testified to as being turned off Nov. 1, 1913, were what we call live services. Completely connected up with the system but simply turned off due to temporary vacancies. Services completely discontinued are cut off at the mains themselves and these are not counted as connections. The revenue figures that I gave on direct are simply the collections from May 1, to Aug. 31, of each of the years including the collections for the half yearly water rates due May 1st of each year. The controversy connected with this litigation probably has something to do with the falling
433 off of collections this year. The 1550 less consumers would hardly produce a difference of $65,000.

Meter rates show an increase of $900 for the period, hydrant rentals about $450, and miscellaneous revenue roughly speaking about 370. Part of the increase in taxes will be due to increased federal taxes and special improvement taxes. My comparison between the year May 1, 1914 to April 30, 1915, with the fiscal year 1913 is a fair comparison, it takes in the complete business of two complete seasons in both cases.

Redirect examination by Mr. Dorsey:

An attack upon the purity of the water supply was one of the issues in the litigation between the city and the company which was begun in 1897 and continued until 1907.

Theoretically the collection of rates from consumers on flat rate schedules and hydrant rentals are made May 1, and Nov. 1, of each year. Those are the dates when the bills come due. Practically the collection is made any time during the six months following the due date. The amount of the rates coming due May 1, is larger than

the amount coming due Nov. 1st because of the irrigation charge for the summer season, which is not made for the winter season.

Recross-examination by Mr. Nye:

The company sometime after the beginning of this litigation agreed because of business conditions to accept monthly payments from water consumers who were unable to pay the full season in advance. This agreement applies more particularly to the small accounts.

Redirect examination by Mr. Dorsey:

The total amount involved on which the time was given on such accounts would probably not exceed $70,000 or $80,000 at the time the arrangement was made. The arrangement was made not because of the pendency of this suit. The effect of that arrangement is not markedly apparent today, because those people are pretty well paid up at this time.

Recross-examination by Mr. Nye:

The figures of collections given are on the basis of 100 per cent of the leaflet rates.

434 Witness CHARLES W. COMSTOCK.

Direct examination by Mr. Dorsey:

I reside in Denver, am a civil engineer. Graduated from the School of Mines in 1890 with the degree of civil engineer 1894 received a degree of Master of Civil Engineering in Cornell University, and in 1898 degree of Ph. D. Since graduation I have followed the profession continuously and exclusively. Have had to do largely with water rights, irrigation projects, and works of that kind since 1888. From April 1909 to April 1913 I was state engineer of Colorado having to do with the administration and distribution of water of the streams in the state. From 1912 to the middle of 1914 I had charge of a large irrigation project in Wyoming. Matters connected with the determination and disposition of water supplies constitute practically the entire duty of the state engineer and his assistants, known as division engineers, of whom there are five, and water commissioners, one for each water district in the state. Appeals from the decision of the water commissioner in any disputed question go to the division engineers and from the division engineers to the state engineer and from there to the courts if anyone remains dissatisfied. State engineer makes reports bi-ennially of the ascertainment of stream flow and other matters pertaining to water supply on the streams in the state.

The experience that I have had has made me familiar with the water supply of the South Platte River and its tributaries, the ditches taking water therefrom and their appropriations and with the extent and value of water rights for irrigation purposes generally in this region. I am acquainted with the property of the D. U. W. Co.

and the S. P. C. & R. Co. and have recently made an investigation of the water rights attached thereto. I have prepared data for the purpose of determining the extent and value of the water rights of Lake Cheesman, which is located on the South Platte River in District No. 23 and is entitled to store water when prior rights situated below it, whose supply is affected by the South Platte River, are satisfied. The water districts below Lake Cheesman in which these rights are located are shown on Exhibit B.

Lake Cheesman has two decrees under which it is entitled to store water. The first of date June 27, 1889, for 30,691 acre feet, the second, Sept. 24, 1893 of 48,373 acre feet. The only storage decree on the South Platte River prior to Lake Cheesman is Barr Lake, situated below Denver whose decree of date Nov. 20, 1885 is for 11,081 acre feet.

There is a small reservoir, Lake George above Lake Cheesman which has a decree for 735 acre feet intervening between the two decrees of Lake Cheesman of date Aug. 31, 1890. It is used
435 for the production of ice so its consumption is inconsiderable. Exhibit A52 consisting of 16 pages of tabular matter contains information as to stream flow in water district No. 8, diversion of water by the ditches in that district, and application of the water diverted. It constitutes part of the data used by me in determining the supply available for storage in Lake Cheesman. The data covers all of the ditches in the district, their appropriations and decrees. The sum total of the decreed amount is 2,109.56 second feet. This represents a larger amount than is to be found in the South Platte above Denver except at very rare intervals. In practice the ditches do not divert anything like the amount of water decreed to them. Tables 2-8 in the exhibits, prepared from the annual reports of the water commissioner of District No. 8, show the annual diversion of water by these ditches for all of the years for which records are obtainable. All of the ditches referred to are for irrigation purposes except where they are noted as for power purposes. In these tables 2-8 are shown the number of days during which water was actually diverted by the ditches and the average quantities taken. By direct irrigation I mean for immediate application of water to the land.

Direct application to the lands is rarely made in the winter season. The records show that the application to direct irrigation under these rights has been confined to a limited portion of the year, approximately 200 days. In table No. 9, a comparison is made of the average diversions for the years for which there are records with the actual diversions in the years 1909 and 1913. These two years being selected because they were years of ample water supply when the actual diversions are presumably all that the ditches require. The total average diversion for all of the years covered by the records of these ditches was 285.13 second feet. In 1909 the actual average diversion by these ditches was 281.25 second feet. In 1913 the actual average diversion was 322 second feet.

From this study I conclude that the demand for water in District

8. bears no relation to the face value of the decrees. Table No. 10. shows that for 23 years District No. 8 has irrigated an average of 18,572 acres and has diverted an average of 76,418 acre feet annually amounting to 4.11 acre feet per acre. The maximum acreage reported was 32,900 in 1913 when 90,360 acre feet were diverted, an average of 2.75 acre feet per acre. It is common talk among irrigators and ditch operators that in this part of the country one acre foot per acre is adequate. The acres irrigated are obtained from the reports of the water commissioners. It is almost invariably reported in excess of the acreage really irrigated. Table No.
436 11 gives a comparison between the quantity of water recorded in the Platte River at South Platte and at Denver. By comparing these gaugings I find an average annual consumption of 76,014 acre feet in District No. 8, neglecting those years in which there was a gain instead of a loss between South Platte and Denver. Table No. 10, from the record of diversion by the ditches showed an average for the 23 years of 76,418 acre feet. The figures are almost exactly the same but do not represent the same thing. The 76,418 acre feet represents an average diversion of water without regard to inflow from any source, but omitting the diversions by the D. U. W. Co. Table No. 11, represents the diversions less the inflow but including the diversions by the D. U. W. Co. In short, the 76,014 acre feet represents the average total consumption of water for all purposes in District No. 8 for 15 years 1899-1913 inclusive. In table No. 11, the quantities by months are dealt with in cubic feet per second. In table No. 12, I show the differences between the discharge of the River at South Platte and at Denver in acre feet. From these studies I have concluded that a mean annual discharge of 75,000 acre feet at Platte Canon or South Platte, together with the accretions to the stream between Platte Canon and Denver will satisfy all demands in District No. 8. District No. 2 is the district lying between Denver and the Cache La Poudre river practically. It is a large district and divided into what is known the upper and lower districts.

In the upper district are twelve important ditches with an aggregate of 1423.68 second feet decreed to them. In the lower district the decreed rights aggregate 1905 second feet or approximately 3300 second feet for the whole district. Table No. 13, Exhibit A52 shows the use of water in upper District No. 2 for the years 1909 to 1912 inclusive. The average number of acres irrigated is 37,179, and the average number of acre feet diverted 135,850, or 3.65 acre feet per acre.

Table No. 14, shows the relationship between the river gaugings at Denver and at Kersey, at the Lower end of District No. 2 prepared for the purpose of arriving at the quantity of water that must be allowed to pass Denver for the benefit of District No. 2. This record extends from 1901-1912 with only partial records for some of the years. The average of the results shows a gain in the river of 223,028 acre feet from Denver to Kersey. Table No. 15, is a computation from table No. 14, to determine the quantity of water added to the river in upper district No. 2, which averages above the mouth

of the St. Vrain, 122,665 acre feet per annum. This is within 13 or 14 thousand acre feet of the total diversion of the upper district.

It is not properly distributed through the district, however,
437 so it is necessary that a larger quantity than the 13 or 14 thousand acre feet be permitted to pass Denver for the benefit of the ditches in the upper District No. 2. To supply the ditches in the upper district that cannot take advantage of these accretions I estimate that an additional 30,000 acre feet must be called for from Platte Canon for the supply of ditches prior to Lake Cheesman. Making a total of 105,000 acre feet necessary to pass the Canon during the irrigating season. Which on the basis of the use indicated by the reports of the division engineer of Division No. 1 for the different months of the season must be divided as follows: May 15%, June 25%, July 25%, August 20% Sept. 10% Oct. 5%.

This places a demand upon the river at Platte Canon in May of 254 second feet, in June 438 second feet, July 423 second feet, August 339 second feet, Sept. 135 second feet, Oct. 85 second feet. During the remainder of the year Lake Cheesman may store so far as the demands in Districts 2 and 8 are concerned. These quantities are sufficient to supply all demand against the stream.

The power rights are satisfied, for their use is a non-consumptive use. Exhibit A53, shows the discharge of the South Platte River at South Platte corrected for the inflow and outflow at Lake Cheesman, prepared from the records of the state engineer's office. Tables cover the period from June 24, 1908 to the end of 1913. From this table using the demands upon the river previously stated I computed the storage available at Lake Cheesman each day. Exhibit A54 shows the quantity in cubic feet per second available for storage in Lake Cheesman form 1900 to 1913 inclusive. Subsequent to June 23, 1908 the corrected tables of discharge at South Platte were used as a basis for this table and prior to that the actual stream flow at South Platte was used. So the results for 1900 to 1907 inclusive show somewhat less storage than would be shown if the corrected tables were available for the entire period. Exhibits A53 and A54 offered and admitted.

I have assumed that Lake Cheesman has the right to one complete filling per year. (Details of storage in Lake Cheesman and quantities available in acre feet over and above the storage from 1900-1914.) Assuming an annual draft on Lake Cheesman of 64,000 acre feet I have concluded from these computations that the reservoir could supply 64,000 acre feet per year clear through to the end of 1914 without shortage in any year and being empty just once at the close of 1904. On the assumption of a continuous draft of 70,000 acre feet there would have been four years in the 13 when the reservoir would not have been able to deliver a full supply. In 1908, 75%, in 1903-4, 85% in 1911, 95%. Dur-
438 ing the other 13 years it could have delivered the full 70,000 acre feet and would not have been empty in any except those four years and would have finished the year 1914 with 27,192 acre feet in storage. On the basis of 70,000 acre feet per annum the

efficiency of the reservoir for the period mentioned would have been slightly less than 88%. And on the basis of its full capacity the efficiency would have been 78%. This period includes the year 1902 which was the year of lowest water supply in the South Platte River of which there is any record, and of which I ever have heard. Lake Cheesman being a stream bed reservoir is capable of utilizing every drop of water that is available for it, having this advantage over reservoirs located off the stream bed. On the basis of 70,000 acre feet annual delivery the water supply of Lake Cheesman is worth $60 per acre foot or for the reservoir, including lands, structures, and water rights, $4,200,000. Which is at the rate of a little more than $50 per acre foot for its total capacity.

The maintenance charges in Lake Cheesman would be practically nothing compared with other reservoirs. There is a ready market and plenty of land in close proximity to Denver for this water at $60 per acre foot. I have made a similar study of the Platte Canon Ditch water rights of the D. U. W. Co. It is my judgment that they would yield 37,670 acre feet per annum for use through Marston Lake. Without interfering with or being interfered with by the storage estimated or Lake Cheesman. There is available also through Marston Lake 6,840 acre feet from Bear Creek making a total from the combination of the Bear Creek and Platte Canon rights of 44,510 acre feet. The value of which is $60 per acre foot or $2,670,600. There are lands available to which these waters could be applied for irrigation purposes, and a demand for the water. I have made no allowance for evaporation in Marston Lake assuming that the purchaser would bear the loss by evaporation and in transit, and the cost of maintaining the works. The figures given include the value of the reservoir and the appurtenant works. In table A52 is listed a priority of the Smith Canal Company aggregating 177.57 second feet, which has been amended, reducing the amount to 57.57 second feet. I am familiar with the water supplies of the D. U. W. Co. obtained through its infiltration galleries. There is a market for the water furnished by these galleries which can be conveniently returned to the river and conveyed to such a point below for diversion as may be found desirable. I consider them worth $60. per acre foot for irrigation purposes. The South Platte River is now over appropriated. A supply of water equivalent to the supply of the D. U. W. Co. for the use of the City of Denver could
439 not be obtained by original appropriation. To reproduce this supply it would be necessary — do so by purchase or condemnation. Even by this means equally good rights for the purpose could not be obtained. Lake Cheesman is the oldest storage right of consequence on the river and the other rights of the Company being perfected for an all year round use demand all of the water available in the stream during the winter months. Assuming, however, that it would be possible by purchase or condemnation to reproduce these rights, the cost would certainly not be less than the value allowed by me for these rights. If water rights were acquired that are now applied to other uses the value of the structures through which they are applied would be destroyed, and compensation would

have to be made for the structures as well as land and water. The value which I have assigned to the water rights of the D. U. W. Co. is for irrigation purposes. They possess a greater value for the purpose to which they now are applied. The value of these rights for domestic purposes is what it would cost to replace them if they were wiped out of existence or if they were devoted to other uses. The people of Denver would be willing to spend whatever it would cost to go two hundred miles to duplicate this supply if it were necessary. It is a very unusual situation to have so large an available supply of water and water rights assembled under one ownership for irrigation or other purposes. In assigning my value I have not added anything for this assembled value.

Cross-examination by Mr. Nye:

I concluded that except under special circumstances the rights in lower district No. 2 would not require water from Platte Canon. Ordinarily the flow below the lower line of upper district No. 2 is sufficient without calling upon any of the later rights of District 8. That condition would not have applied in 1902. I think it would for the greater part of 1904. I did not examine the water commissioner's reports for each of the years, 1900 to 1914 for District No. 2 because I believe that I have sufficient knowledge of the general run of conditions from experience with them to guide me as well as the water commissioner's reports would have guided me. Ordinarily water commissioners call for all of the water they can get. They are not always unbiased state officials. They are working for a particular district as against other districts in many cases. I regard the record of the increased flow of the river through district 2 between Denver and Kersey, which is a net increase over and above all demands averaging more than 200,000 acre feet per annum, as a better guide to whether those ditches were supplied than the
440 report of the water commissioner. If the ditches in District 2 had been short that amount of water could hardly have passed out of the district. That amount accounts for the entire inflow from both tributaries and seepage.

Water commissioners' reports are part of the records of the state engineer's office. They are reasonably reliable. I use them to determine the acreage irrigated and water applied. Those which claim a shortage of water indicate the latest priority supplied. They are the real basis for the operation and administration of the water supply by the state engineer's office.

I have treated the Lake Cheesman rights as being in all respects parallel to a direct flow irrigation right limited only by priority and entitled to all year round storage. In my calculations I adopted as the specific limitation for the irrigation season the period from May 1. to Oct. 31, because it appears to be the actual irrigation season made by the water users themselves. It is the period within which the records show most of the water to have been used for irrigation. Though while I was state engineer water was demanded and accorded to direct flow rights before May 1, and after Oct. 31. In calculating the percentage of water used in District No. 2 I find

that the records of one year show two per cent of the annual use during April. In making up the table in Exhibit A52 I used the actual number of days when water was used in each year in connection with the quantity of water diverted in that year and took the average of the days. I think that in looking into the future that method will be found to produce fair results.

There will be years when the consumption will be greater than the average shown and there will be years when it will be less. The average use for the 22 years by the High Line Ditch was 183.96 second feet, while in 1909, they used 195 second feet. I do not know whether that 195 second feet was its full supply or not. That was my first year as state engineer. I don't remember whether there was a demand for more water than was being received by that company in that year.

If the High Line Ditch was not getting its full demand in 1909 I would not put the calculations against actual results. The calculations are used in the absence of actual results in most cases. I have considered these averages as showing a present limitation of right to demand on the part of these ditches. I do not think the same limitation applies to Lake Cheesman there is a fundamental difference in the situation. Lake Cheesman with a known capacity has stood for years as a notice to subsequent appropriators that the full capacity of the lake can be called upon if needed in any
441 year. It was not within its power to use, or not use as, it might choose, the water, it could only make such use as the demand might come, it could not even create the demand. A ditch diverting water for irrigation purposes can create a demand within certain limits. The owners may bring under cultivation more land. As a matter of fact they use all their efforts in this direction. If after years of effort, 25 as shown in these records, they have reached a limit, I believe that is the limit of what that ditch can have as a right to supply from that time on. I think that otherwise for an indefinite period, perhaps a hundred years hence, no user of water in the South Platte River could rely upon what he could get. If the owners of the ditch do not bring their use of water up to the limit set by their decree, they are at fault. Lake Cheesman as it has been used could not increase the use of water by any efforts it might make. I presume these ditches have a capacity in excess of the average allowed them. I don't think that to the extent of the size of these ditches and physical structures they are equally of notice as Lake Cheesman because they cannot take water unless they can use it immediately. A storage reservoir can take the water when it is entitled to get it.

They are of notice in that respect to the extent of the land to which they can and do supply water, the same as Cheesman. I think that in some instances at least the cultivated area has reached its final limit under those ditches. The High Line for instance. Most ditches divert all of the water they can get and turn back what they don't use through waste ways and tail ditches. In this table of averages, is the element, in some years at least, in the case of the High Line, of absolute inability to get more water. That is compensated

for by other years when they took a great deal more water than they had any use for. The High Line is limited in its contracts for water supply to from 20 to 25 thousand acres. In this average table the year 1902, which was the worst year for all of the ditches, is not included. I have taken into account all of the years for which there are records. I think that is a fairer method than to take any one year or a short period. 1900 was a big year for the river. If the High Line did not get all the water it wanted that year I don't know why. Over 600,000 acre feet of water passed Denver that year and yet the record shows that the High Line only took 68,400. If the High Line was equipped with storage the acreage could be increased to the extent of the storage.

If that water were supplied by Lake Cheesman, the reliability of which I am familiar with I don't think that would increase the direct flow right of the High Line under its decree, I do not think that anything which was done now or which has been done within recent years can entitle the High Line to make increased
442 draft upon the river. I simply use the High Line as an illustration and think that is true of any canal. If the 2109.56 second feet decreed above Denver in District No. 8 were to be supplied it would not be worth while to think of any further use of water. There are relatively few days in the history of the river when that quantity has been available.

Eliminating the power rights from the total amount decreed in District No. 8, there remains 1,467.75 second feet of decreed rights to the ditches listed in Table 9 which by the method of averaging used has been reduced to a total average use of 283.12 second feet. The basis of the reduction really amounts to a failure to use up to the original decree. The average acreage under irrigation using the 76,418 acre feet of water was 18,572. The acreage irrigated has increased during the latter part of the period from 23,947 in 1905 to 32,900 in 1913, being nearly constant for 1907-8-9-10, at about 26,000 acres. The abrupt increase fom 1910 to 1911 I think was due to use of Antero Water.

Table No. 11 Exhibit A52 deals with the difference in quantity in the South Platte River at South Platte and at Denver. I used it for the purpose of arriving at the total consumption in District No. 8. The record covered 116 months out of which I include 88 in the table because those are the months when the discharge at Denver was less than the discharge at South Platte. In the other months there was an increase in the stream between South Platte and Denver.

Therefore, I eliminated them in order to subject the stream to the severest test possible. Had I included them the demand upon the stream would have been less than the 76,014 acre feet which I derived. The fact that tables 10 and 11 result in practically the same figures cannot be considered in the sense that one result is a check upon the other.

It is not true that my conclusion of 75,000 acre feet required for District No. 8 is based more largely upon table No. 10 than upon the others. I have considered both tables 11 and 12 in arriving

at that conclusion and I think that 75,000 acre feet is a liberal allowance for District No. 8. More than enough in most years. Table No. 13, Exhibit A52 is based upon only four years' record of the ditches in District No. 2. I was unable to obtain additional records when I was working up that data therefore I used what I had at hand. I should have preferred to have as long a record in Dist. No. 2 as I had in Dist. No. 8. The average diversion of water in that period 3.65 acre feet to the acre is about 50% too much. About 2/3 of that would be more than a liberal allowance. The length of ditches used has a bearing upon the quantity of water re-
443 quired. Other things being equal the longer the ditch the greater the loss. So far as I know the practice of the state engineer's office has been to permit each ditch to divert what it demanded up to the limit of its decree in the order of its priority. Character of soil may make a difference in the amount of water required. I don't think the soil in Dist. No. 2 demands more water than in Dist. No. 8. Table No. 14 is made up from gauging measurements. Table No. 15 is a compilation of seepage measurements. I used table No. 15 in my computations because I wanted to get information on upper Dist. No. 2 above the mouth of the St. Vrain. Table No. 15 so far as I know is the only guide to the distribution of the accretion in Dist. 2 along that 52 or 53 miles of river. I have not used it to determine the amount of inflow into the river but to determine simply the proportion which comes into the river above the St. Vrain. I applied the proportions to the entire river flow regardless of what part was surface and what part was seepage flow. And assumed the additions between given points in surface flow were in the same proportions as additions to seepage, that is not as gratuitous an assumption as it seems. Those things are measured out in making seepage measurements as the flow of the tributary stream upon the surface. I should have preferred the records of a gauging station at or near the Mouth of the St. Vrain for a period of years. But in its absence I think this a reasonably good guide. In my direct testimony referring to table No. 13 I selected three ditches. The Farmers and Gard-ners, The Burlington, and Fulton, as the ditches which are most likely to require water coming from above Denver. Those ditches would have less advantage from the return flow. The Fulton and the Burlington have their headgates below the Denver Sewer discharges. In table No. 16 the estimate of the proportion of total seepage inflow into Dist. No. 2 which accrues above the Fulton Ditch, is taken from the seepage measurements at the head of that ditch. From that I concluded that 1/8 of the gain in the river between Denver and Kersey was available above the Fulton Ditch, and was available for the supply of the Fulton Ditch. That accretion would all be available for the Fulton and only part of it for the Burlington and none of it for the Farmers and Gard-ners. I eliminated the Duggan Ditch because it is my understanding that its decree has been transferred to the Burlington.

That table is not based on theory but on years of actual observation. I have not calculated the number of acre feet consumed by the Farmers and Gardeners, the Burlington, Duggan and Fulton ditches

in those four years. The average amount of land irrigated in
444 Dist. No. 2 for the four years was 37,179 acres. I estimated 80,000 acre feet necessary for that acreage, of which the Burlington, Farmers and Gard-ners and the Fulton would divert about ½. I think that is a fair way to determine the amount of water which should be allotted those ditches. I arrived at the percentage diverted each month in Dist. No. 2 from the reports of the division engineer giving the actual monthly diversion in acre feet. In determining the quantities necessary to pass Platte Canon in any given month I applied those percentages to the total quantity assumed to be necessary for the season. I assumed that the same percentage would apply in dist. No. 8 as in Dist. No. 2. The Platte Canon Ditch is included in the quantities estimated. In making these calculations I took into consideration the right of Barr Lake to store through the Burlington Ditch. From these computations I came to the conclusion that Lake Cheesman could store any excess in the river during the irrigating season above the amount which I have allowed for the month in which the storage might occur, and during the non-irrigating season it could store all that came to it. There is sufficient flow in the river below Lake Cheesman to supply the 56 second feet of the Platte Canon ditch about 95 per cent of the time. My estimate of 20 feet for the first appropriation of the Smith Canal coincides with the figures set forth in the supplemental decree recently granted. Exhibit A53. The corrected stream flow of the river at South Platte was made up from the records of the state engineer's office. Table A54 is built up from that and from the figures based on my own estimate of 105,000 acre feet at Platte Canon for the ditches.

The figures in page one column 1 Exhibit A54 show the possible storage in Lake Cheesman for January 1900 in cubic feet per second. That is the total flow of the South fork at Lake Cheesman. To ascertain the acre feet available for each month I multiplied the total second feet for the month by 2. The mean storage for the years 1900 to 1913 was found to be 63,000 acre feet. I found that at the end of 1904 there would still be practically 4,000 acre feet in the reservoir and at all other times more than that and I therefore increased the annual draft to 64,000 thereby emptying the reservoir at the end of 1904 but at no other time. Subsequently I used 70,000 acre feet draft to determine just how much shortage there would be at that rate. I testified that in 1903 and 1904 the reservoir would have delivered 85% of the 70,000 acre feet, in 1908 75% and in 1911, 95% in other years a full supply. The use of the mass diagram or an equivalent method, for determining when the water would be stored
and when it would be drawn, would serve to determine the
445 stage of the reservoir at various periods but would not change the final rseult. For that reason I did not prepare any curve.

I have considered that during the irrigating season storage would be accomplished at times when water was being drawn from the reservoir. In determining the amount left in the reservoir at the end of any calendar year I have taken into consideration the addition from storage during that year. The only water that is considered in the assumed draft is the water which actually belongs to the reservoir. I

have not considered the water that simply passes through it. In my consideration I have not apportioned the discharge over different months but I see no reason why the ration should be any different than the percentages used for irrigation under ditches in Dist. 2 and 8. I considered the evaporation loss on the same basis as loss in transit to be borne by the purchaser. In my determination of value of the water I allowed 2 acre feet at the reservoir for each acre of land to be irrigated.

I have considered the 70,000 acre feet of water in Lake Cheesman as capable of supplying a developed area of 45,000 acres of which not to exceed 80% would be actually under irrigation in any one year. That is, approximately 36,000 acres. That leaves practically 2 acre feet per acre for the land actually irrigated. I have assumed a loss by evaporation and in transit of 25 per cent and a consequent delivery on the land of 1.5 acre feet for each acre of land irrigated. I have considered that the cost per acre of land is the value that I have placed upon Lake Cheesman of $4,200,000 divided by 45,000 or something less than $100 per acre. Transportation and maintenance would be an annual charge. The same treatment would apply whether the water was used as a supplemental supply or a complete supply.

There are enough lands under the High Line ditch to absorb all of the water from Lake Cheesman. I have not determined how many miles water would have to be carried to reach the land capable of absorbing it all. My total valuation of $4,200,000 includes water and structures. I made no segregation between the two. Lands under the High Line Ditch are capable of standing a cost of $60 per acre foot for a water supply. It is not necessary for those lands to construct or acquire an interest in an original main canal, all the construction necessary would be laterals. They could contract the carriage of water in existing canals. I know of transportation contracts as low as 8 cents per acre foot per year and some as high as 25 cents. Lands that I had in mind are practically tributary to Denver. They would be used to raise crops of the higher values.

I have no knowledge of the cost of Lake Cheesman or its
446 structures and have made no estimate on the cost per acre foot of construction compared with other reservoirs. I made no investigation to determine whether there was a contiguous block of 45,000 acres under the main canal of the High Line which could take and use this water. In my treatment of the Platte Canon Ditch rights I included the Bear and Turkey Creek rights and also Marston Lake. The combined winter flow of the Bear and Turkey creek rights would be less than the storage capacity of Marston Lake. In my judgment the entire flow from these two sources could be made available for irrigation. I treated the Platte Canon Ditch as an all-year-round right because it has been so used for about 25 years. I knew that all of the water of the ditch did not belong to the D. U. W. Co., part of it belongs to the Lehow estate and water for 195 acres is also used for irrigation by other parties. I made deductions for those uses. The water used by these other parties is included by me in the winter use of the D. U. W. Co. I regard the Mississippi st. and Platte Canon rights as all year round rights for the same reason as

the Platte Canon Ditch right. I believe that the point of diversion of the Platte Canon gallery rights could be changed to the 60 inch conduit, if desired, by application to the court. And the water used for that conduit if it was in the stream. I would not change the Mississippi Street galleries to a surface diversion if I were trying to utilize that water for irrigation. I did not testify in regard to the Cherry Creek gallery right. I have made no investigation to determine the quantity of water returned to the river through the sewers of Denver as compared to the quantity of water supplied by the D. U. W. Co. at Wynetka. I have made no investigation to determine the accretion to the river in or near Denver as a result of the use of irrigation water in Denver. If there is a return flow it is included in the figures given as accretion to the stream at given points.

In valuing these rights as all-year-round rights I assumed they would be continued as such if their use for domestic supply was discontinued and they were applied strictly to an irrigation supply. Also, that the rights of Lake Cheesman would be continued as they are if used strictly for irrigation. I assumed that these rights could be transferred without respect to any other rights arising by virtue of the method of use in the past.

Redirect examination by Mr. Dorsey:

In consideration of these rights I did not give consideration to the rights in Lower district No. 2 prior in time to the rights of the D. U. W. Co. because I concluded that the river was sufficient normally to supply all such demands with the rights above fully sup-
447 plied. I do not call to mind any specific instance when Lake Cheesman was not allowed to store because of the demand for water by the water commissioner of Dist. No. 2 or otherwise. There may have been such occasion. In speaking of the irrigation season as from May to Oct. I meant the practical irrigation season established by custom and use. The Epperson or Green valley ditch regarding which I was asked on cross examination is a ditch located on the west bank of the Platte river with a capacity of 2¼ second feet which recently received a decree running back many years.

That ditch, though not included in my list, would in no manner affect my conclusions as to these water rights. From my study of the Platte Canon Ditch in relation to the other ditches I am satisfied that it should have had its full appropriation during 95% *cent* of the time. By demand upon the stream I had in mind the total amount of water that might be called for under any reasonable use and within the decreed rights of these various ditches. I have not thought of it as meaning the unsatisfied demand. In eliminating the power rights I did so partly from the fact that the water commissioners did not report the amount of water diverted by these ditches, partly from the fact that the water is not consumed and is available again to supply other ditches, also, from the fact that the water company owns all of the power rights except the Smith Canal Company's ditch and a half interest in the Platte and Denver Ditch, concerning which I understand the company has an agreement with

the city, the owner of the other half, that no portion of its claim will be asserted against the Platte Canon Ditch. The power appropriation for the Petersburg Ditch has not been used since I have had any knowledge of the Platte river. There is another consideration in connection with the water for the Smith Canal Company's ditch, it is diverted by the D. U. W. Co. through Lake Archer, used first at the West side Pumping Station and discharged from the tail race there into the Smith canal.

It is my opinion that the irrigable acreage of lands listed in table one exhibit A52 has been fully developed. It is also my judgment that there has been an excessive taking of water for these lands. The limitation upon the acreage under the High Line canal is the irregularity and lack of dependability of the supply under the direct appropriation of the ditch. The acreage might be very much extended if the Lake Cheesman water rights were available for the use through the ditch. I believe the total irrigable acreage under the High Line is in the neighborhood of 85,000.

448 If any of the ditches having direct flow rights which were compared by me availed themselves of the right to store water for use in the same season, in accordance with the Seven Lakes decision, it would not in any manner affect the conclusions given in my testimony. In the total of 1467.75 second feet brought out by Mr. Nye as the total of the irrigation decrees in District No. 8 1184 second feet of the amount is represented by the decree of the High Line Ditch and 81 second feet by the decree of the Petersburg Ditch. The capacity of the High Line is only about half of its decreed appropriation and of the Petersburg Ditch most of the appropriation is for power purposes which has not been used for years and only 7.6 feet of which decreed for irrigation is in use. There also is included the decree of the Brown Ditch for 16.5 second feet, though since 1889 its diversions have never reached 6 feet average for the reason.

Table No. 10 Exhibit A52 indicates a gradual increase in the acreage irrigated in district No. 8. It does not indicate a corresponding gradual increase in the same proportion of the quantity of water diverted by the ditches. The conclusions spoken of by me as sometimes drawn from seepage data and not sufficiently supported thereby were conclusions of a different character from those which I drew from the seepage data in connection with these water rights. By the seepage measurements we undertake to ascertain what the total gain in the river is in any given distance exclusive of the gain from inflow of the tributaries. When I based my conclusions as to the points where gain is made in Dist. 2 upon seepage measurements, that data afforded the only information about the accretion to the river otherwise than by surface streams flowing into it. Table No. 13 shows the diversion by the Duggan Ditch in 1909-10 and none in 1911-12. If that right has been transferred to the Burlington, then the diversion shown by the Burlington in 1911-12 include- the waters diverted under the Duggan right.

The Platte Canon Ditch could continue to divert 95 per cent of its priorities with storage being made in Lake Cheesman at the rate

which I have assumed. That little storage was possible in Lake Cheesman in 1902 is not remarkable. So far as the records go 1902 is the year of lowest stream flow ever known. Exhibit A54 indicates considerable storage during the irrigation months in most of the other years. If the water furnished by rights of the D. U. W. Co. was used for supplemental supply instead of a complete supply, the number of acre feet per acre required would be less for the supplemental supply. Speaking from my general knowledge of the South Platte River I should say that there is no considerable
449 accumulation of silt in Lake Cheesman. I am of the opinion that the cost of maintenance of Lake Cheesman per acre foot of storage would be less than the average cost of maintenance per acre foot of storage for other reservoirs in Colorado. I did not testify as to the quantity of water available from the Platte Canon infiltration galleries. I may have testified as to its value. I merely suggested that it might be handled through the 60 inch conduit. That is not the only way it could be handled.

There are certain of the other water rights of the D. U. W. Co. regarding which I did not testify because I have not had the time since I began the study to do more than I have done in connection with Lake Cheesman, Platte Canon and the other rights concerning which I did testify.

I think my assumption that one eighth of the total accretion to the Platte river between Denver and Kersey occurs between Denver and the Fulton Ditch is conservative, as is also my estimate of the part of that accretion that would be available for the supply of the ditches between Denver and the Fulton. It allows a sufficient margin of safety so that the ditches below having prior appropriations will be supplied, so far as the river is at any time capable of supplying them.

Recross-examination by Mr. Nye:

In determining the acreage upon which the water diverted from the Platte River was applied, I did not take into consideration the acreage watered through the Epperson Ditch. I think it is true that the City Ditch and the Brown Ditch are now supplying all of the acreage possible. I stated that in my judgment the use of water through these ditches had been excessive, because three acre feet and upwards is an excessive use of water. I know the character of the crops raised under some of these ditches. Under the Nevada there is some garden truck, largely general field crops, under the Epperson mostly garden stuff, celery, etc. I do not know that the Brown Ditch has supplied at times as high as 12 second feet not later than 1912. If it did there must have been others when it supplied less than 5 feet since its average for 1912 is 5.55. It is highly improbable that the amount available in the river that year had anything to do with the amount received. It may have had in some years. I stated concerning Table No. 10 Exhibit A52 that the increase in water diverted by the ditches was not in proportion with the increase in acreage indicated under the ditches. The fluctuation of the stream

has to do with the amount of water diverted by any ditch except the oldest, but in the case referred to the largest diversions are not always in the years in which the water supply was largest. That would not necessarily indicate that the demand in a dry year was the greatest. The water supply in the river and precipitation during the growing season are not always alike. It happens that in 1902, the year of very lowest river we had more than a normal precipitation during the growing season at Denver, also in 1908. Those were the two driest years we know anything about here recently. When there is a great deal of rainfall during the growing season the ditches do not require water regardless of how much water there may be in the river and the land does not require it. The records of decrease in river discharge between south Platte and Denver indicated in table 11, Exhibit A52, are reasonably accurate records. For the year 1904 the total discharge at Denver was 151,714 acre feet. I am not able to say that that was an average year. The mean monthly discharges in second feet at Denver were as follows: Jan. 71, Feb. 72, Mar. 63, Apr. 87, May 357, June. 482, July 351, Aug. 409, Sept. 234, Oct. 153, Nov. 123, Dec. 98. 1906 shows about 1/3 greater discharge. The mean monthly discharge in cubic feet per second at Denver were as follows: Jan. 72, Feb. 79, Mar. 99, Apr. 207, May 644, Jun. 341, July 323, Aug. 303, Sept. 320, Oct. 489, Nov. 597, Dec. no record. The estimated available storage for the six months, May to Oct. inclusive for that year was 123,850 acre feet. Table No. 8, Exhibit A52, shows that for the same year the High Line Canal received only 245 second feet or 80,805 acre feet for the season.

Redirect examination by Mr. Dorsey:

According to the water commissioners' report for 1913 the only year in which the Epperson ditch has been reported, the number of acres irrigated was 50. The inclusion of that acreage in my totals would in no manner affect the conclusions I have drawn or the facts set forth. When I said that the application of water in Dist. No. 8 was excessive, I meant that the diversion was excessive. The table which Mr. Nye asked me to prepare from the records of the state engineer's office containing the inflow and outflow of Lake Cheesman is the record as I found it in that office. I have no personal knowledge on the subject. The figures are reported to the state engineer by the D. U. W. Co. I copied my figures from the cards sent to the state engineer's office by the attendant at Lake Cheesman and bearing his signature.

Recross-examination by Mr. Nye:

The table in which the term excessive use of water was applied did not include the diversions by the D. U. W. Co.

451 Witness A. A. EDWARDS.

Direct examination by Mr. Dorsey:

I have resided in Colorado near Fort Collins for 38 years. My business is Irrigation Manager. Been connected with irrigation enterprises since 1891. With The Water Supply and Storage Company of which I was president and manager for 15 years, with The Mountain Supply Ditch Company of which I was secretary and manager, and the Poudre Valley Reservoir Company of which I was director and president. They are large enterprises. Am familiar with the use and value of water for irrigation purposes. In addition to the projects with which I have been connected I have knowledge of other irrigation enterprises. Have recently given consideration to the extent and value of certain water rights of the D. U. W. Co. particularly those of Lake Cheesman. Have not visited the lake but know its location, its approximate capacity and location on the river with respect to the City of Denver. The elevation of the reservoir and available acreage of land under it has a great deal to do with the value of water for irrigation purposes. Lake Cheesman is far up in the mountains and there are large bodies of land on the Platte water shed adjacent to Denver.

In my judgment the value of the water rights in Lake Cheesman is from $60 to $65 per acre foot. On the efficiency shown by Ex. A31 I think the total capacity 79,064 acre feet could be sold for a minimum of $60 per acre foot. If sold on the basis of 64,000 acre feet average storage per year they would be worth $65 per acre foot for the 64,000 acre feet. On the assumption of 70,000 acre feet delivery over a period of 15 years with shortages in four years, in two of which the delivery would have been 85% and in another 75%, and another 95%, I would consider the water worth on a basis of 70,000 acre feet, $60 per acre foot. In my judgment the value of Lake Cheesman is between $4,000,000 and $4,500,000. A stream bed reservoir, such as Lake Cheesman, possesses advantages over a reservoir not in the stream bed because it has no outlet ditch limitation to interfere with its ability to get water. It also is more economical to maintain. Reservoirs off the stream bed have a good deal more artificial work and necessitate much more protection. There also is an advantage in discharging water into the stream where it is available to all ditches below, while the reservoir off the stream bed must have canals to connect it with the ditches that it is to supply. Also, in the case of the stream bed reservoir located above the ditches there is

no necessity for exchanging water with other appropriators.

452 At the altitude of Lake Cheesman, I would not expect silting to any extent. In fixing the price on Lake Cheesman I assumed that the buyer would purchase a certain capacity of the reservoir and assume his share of expense of maintenance and whatever cost was involved in getting the water to the land. In my judgment the water rights at Marston Lake per acre foot are just as valuable as the Lake Cheesman.

Cross-examination by Mr. Nye:

In fixing this price on the water I have assumed that there was ample raw land needing water to use this total amount. In my judgment the water would sell for the same price as a supplemental supply to land having an insufficient water right. Stored water is more valuable than direct flow water. You can turn it on your land just when you need it and hold it back when you don't need it. I know of sales of stored water in my neighborhood for season delivery at prices ranging from $30 to $100 per million cubic feet. This is in affect a rental value. I know of no sales in our neighborhood of purely reservoir water at prices of from $50 to $55 per acre foot. Our companies are all mutual companies that have constructed their own system and each share of stock participates in whatever the system has each year. The deduction for loss in carriage by the water officials varies from 5 to 10 per cent.

I arrived at my values of $60 to $65 per acre foot by computations based on the market value of the stock in the systems that I am acquainted with. I did not assign a higher value to the water because of its availability to lands near Denver. But I consider that the lands that the Cheesman water would supply are more valuable than the lands in our neighborhood.

I think the fact that Lake Cheesman is constructed in the stream bed makes the water more available than in a plains reservoir. I assigned practically the same values to Marston Lake because it lies above the lands to which it could be applied. I am also assuming that it is a sure filler every year. It cannot be filled as advantageously as a stream bed reservoir. But I assigned the same value assuming that it is certainly filled every year. It has two or three different sources that it can fill from. The water that I testified about as having been sold for season use by the million cubic feet was delivered at the reservoir and the purchaser paid the carrying charge. The carrying charge is from $3 to $5.50 per million cubic feet.

Redirect examination by Mr. Dorsey:

I have a general knowledge that there are large bodies of land adjacent to Denver not now supplied with water, to
453 which this water could be applied. The $30 to $100 per million cubic feet season sale price is really an annual rental price. I only know of one sale at the minimum figure of $30, that was very near the close of the irrigation season when there was scarcely any demand for water. With the exception of that one I have not known of any sales at less than $50 and from that up to $100. The $30 price is equivalent to $1.25 per acre foot per annum and the 100 price to $4.25 per acre foot per annum. There is not nearly as much rental water in our district now as there was formerly because the enterprises that former-y rented water have completed their systems and are applying their water to their own lands.

I do not think that the fact of a reservoir's location on a stream bed adds anything to the acre foot value of the water. There is an

advantage in its being located above the land so the water can be utilized without exchange. Water that is above the land can be applied as it is needed and held back when not needed. Therefore is more available than water from direct decrees or from the system of exchanging with the river as we do. The carriage charge of $5.50 per million cubic feet was imposed by the Poudre Valley Company. Water was carried about 18 miles. A million cubic feet makes approximately 23 acre feet. So the charge is at the rate of about 24¢ per acre foot for the carriage. The $3.00 rate that I mentioned was a special price made to some of the minority stockholders in the original company. That is equivalent to a charge of about 13¢ per acre foot. Marston Lake is smaller than Lake Cheesman. Marston Lake is nearer to Denver than Cheesman, and nearer to some of the lands that could be supplied from either or both reservoirs.

Recross-examination by Mr. Nye:

In estimating those values per acre foot I estimated it on the market value of shares of stock in three irrigation systems. In the North Poudre irrigation company and in the Water Supply and Storage Company the value is $50 per acre foot and in the Larimer and Weld Irragation Company $71.25 per acre foot. The Greeley-Poudre district is in my neighborhood, it has upwards of 125,000 acres not yet supplied with water.

Redirect examination by Mr. Dorsey:

The Greeley-Poudre district lands lie north east of, and above the systems that I testified were now fully developed and supplying their full capacity.

454 Witness DANIEL A. CAMFIELD.

Direct examination by Mr. Dorsey:

I have resided in and about Greeley Colorado for 35 years, am engaged in farming, live stock, irrigation, and other business. Have been interested in irrigation enterprises since 1887. That has been my business almost altogether since 1895. Have been president and manager of companies that have financed and built the works of the Bijou, Queen City, Fort Morgan, Hillrose, North Sterling, Julesburg, Riverside, Montezuma Valley, and the Greeley-Poudre District in Colo. The Eden Valley District in Wyoming, the Las Vegas, in New Mexico, and some other smaller ones. Except the Eden valley, Las Vegas, and Montezuma Valley, they are all located on the South Platte river or its tributaries. Work has consisted of building the ditches and reservoirs that go with the works. They are large enterprises the cost of which has been about 10 or 11 million dollars, involving the construction of very large reservoirs and large and long ditches. This experience has made me familiar with irrigation practices and the value of water rights for irrigation purposes.

I am familiar with lands and water rights in the vicinity of Denver. And with Lake Cheesman. Assuming that the capacity of Lake Cheesman to deliver water is as has been testified to here, 57,016 acre feet per year for last 16 years or 64,000 acre feet per year over a period of 15 years (1900 to 1914) without failure, or 70,000 acre feet per year for all except four years out of 15. It is my judgment that the reservoir would have a value of $60 per acre foot for its full capacity, 79,064 acre feet, cost of maintenance and carriage to be borne by the purchaser. It is my judgment that there is available under that reservoir more than twice enough land to absorb that amount of water. A stream bed reservoir such as lake Cheesman has the advantage of being able to take all the water flowing in the stream to which it is entitled without limitation by the size of inlet ditches, also it has no inlet ditch to maintain. Nine-tenths of the reservoirs in Colo. are plains reservoirs. In my judgment the maintenance cost per acre foot of capacity would be less than 1/10 as much in Lake Cheesman as in the average irrigation reservoir. The fact that that cost must be borne by the purchasers of water would affect the value of water rights in Lake Cheesman. Stored water or water equivalent to stored water is more valuable than water available through direct appropriations because it can be used just when you want it without waste and without regard to the conditions of the stream. Lake
455 Cheesman lies above all of the lands that I had in mind that could be irrigated and its water can be used without the necessity of exchange, which also adds to its value. I am also familiar with Marston Lake and assuming a delivery capacity of 40,000 acre feet per year through that reservoir, it is worth in my judgment, also $60 per acre foot. There is an abundance of land under that reservoir to which that water can be applied, and a market for it deliverable at the lake at the price mentioned.

I have applied the price of $60 per acre foot in the case of Marston Lake, upon its actual deliverable capacity because of the fact that it is a plains reservoir. I assume that the water from Marston Lake would be turned into Bear creek for delivery. The cost of structure involved to accomplish this would in my judgment be about $5,000. There would still be a large amount of land in the vicinity of Denver unsupplied with water after Cheesman and Marston Lakes were both used to their full capacity.

Cross-examination by Mr. Nye:

I visited Marston Lake last Thursday. I have never been at Lake Cheesman but have been above and below it. I arrived at my valuation of $60 per acre foot, partly from my knowledge of the immense amount of land available near Denver on part of which millions of dollars have already been spent and which now have a wholly inadequate water supply, and partly on the selling value of water in other parts of the state and from reservoirs on the same river with subsequent priorities.

Water in the Larimer and Weld systems has been sold at an

average price of $65 to $70 per acre foot evidenced by shares of stock. The stock represents an interest in the capacity of the system. And the water delivered depends upon the amount of water the system can get. I think under ordinary conditions an acre foot of water will supply an acre of land. I assumed that the D. U. W. Co. or its subsidiary company owns this water and that it can in the future be applied to irrigation without regard to the use that was made of it in the past. I assumed that the price of $60 per acre foot gives the purchaser an interest in the structures as well as in the water. There is plenty of land to take the 119 thousand acre feet of the two reservoirs, I should say within an average distance of 25 or 30 miles of Denver. Main canals of other partial supply systems are already constructed for most of these lands. By the term equivalent of storage water I mean water that you could get whenever you wanted. I know of no water under the systems that I have been interested in building, selling at $60 per acre
456 foot. There is no water for sale under these ditches. They are all districts and the districts own the ditches reservoirs, and everything connected with it.

The cost of the works in these districts has been much less than $60 per acre foot but I don't think the cost of the works has any relation to the value of the water. The water under these districts is not as valuable as the water from Lake Cheesman. There is no place in Colorado where the same circumstances exist as in the cases of Cheesman and Marston Lakes. The Larimer and Weld Canal has been in operation since 1880. Rights sold originally under it at $300, I think a few at $250. The price now is $4,000. It has been rising steadily during the 30 years.

Redirect examination by Mr. Dorsey:

I have not visited Lake Cheesman myself but have seen photographs, maps and drawings of the Lake and the dam. Am familiar with works of that kind so am informed from these data as to the nature of the reservoir and the dam creating it. In dealing with the 40,000 acre feet capacity of Marston Lake I assumed that 40,000 acre feet would be deliverable at the lake when required and as required. I didn't mean that that was the storage capacity of the lake. When I stated that the water in the other projects with which I had been connected was not as valuable as the water in Lake Cheesman I based the statement upon the difference in conditions, surrounding the projects. Such as location of the enterprise with reference to water available, location of land with reference to surrounding value, market, etc.

The efficiency of Lake Cheesman is unusual. I believe there is only one reservoir in Colorado that would compare favorably with it and that is Lake Loveland which is about 1/10 as large. I think the Riverside would have the same efficiency. That is a large reservoir too. The efficiency there however has not been determined by the record of such a series of years. This is the first year it ever has been filled to its capacity.

Recross-examination by Mr. Nye:

In fixing the value of $60 per acre foot on these water rights it was my idea that the water might be delivered through several systems. The capacity of the Riverside reservoir is in the neighborhood of 50,000 acre feet, I should say the value per acre foot of its water is about $30.

457 Witness CHARLES F. TEW.

Direct examination by Mr. Dorsey:

I am a lawyer and have resided at Greeley Colo. since 1897. Have been connected in a legal capacity with the construction, acquisition of water supply, etc., of a number of irrigation enterprises, and after construction in the matter of control diversion, storage, and distribution of water supply by means of some of these systems. Among these are the Greeley-Poudre, Riverside, and Bijou, Districts and the Green City and Henrylyn Districts and with the original Antero Reservoir project, and with a number of other minor projects. My connection has been both as counsel and in an executive and administrative capacity. And has required me to investigate and become familiar with water rights, their extent and value and the value of lands, both irrigated and un-irrigated. I am acquainted with and have visited Lake Cheesman and am familiar with the water rights claimed for it.

Assuming that the capacity of Lake Cheesman to deliver water is as has been testified to here, an average of 57,016 acre feet for last sixteen years or 64,000 acre feet over a period of 15 years (1900 to 1914) without failure or 70,000 acre feet per year for all except four years, out of the 15, it is my judgment that the reservoir would have a value of $60 per acre foot, on the basis of 70,000 acre feet or a total gross value of $4,200,000. I think there are available, lands, needing that supply which would take it at that price. A stream bed reservoir has numerous advantages over a plains reservoir. Its cost of maintenance is lower, there is less exposed embankment and it discharges directly into the stream, so the only cost of distribution is the operation of the discharging device from the reservoir to the stream below. Also, its ability to take whatever may be the whim of the stream as to flow, and the fact that its intake never will be out of commission. A large majority of the irrigation reservoirs in Colorado are plains reservoirs. Lake Cheesman is located above all of the lands and all of the ditches to which the water may be supplied so that it can be utilized directly from the reservoir without exchange. This is a marked advantage because it sometimes happens that water in a reservoir which must be made of value by exchange, cannot be so used because of the inadequacy of the flow of the stream with which exchange is to be made. The average cost per acre foot capacity for maintenance of Lake Cheesman would be much less than in connection with the average irrigation reservoir.

I visited Marston Lake, also the property of the D. U. W. Co. As-

suming the ability of that reservoir in conjunction with the
458 Platte Canon and Bear Creek supplies to deliver each year without failure during the irrigating season 40,000 acre feet of water, I would consider that water worth $55 per acre foot. I consider this supply worth less than the Cheesman supply because of the necessity of maintaining intakes, inlet ditches and pipe lines, and also because of the necessity if my understanding is correct for exchange of the water there stored to be utilized on the lands under the High Line Ditch. If the water supply is continued under the same ownership as Lake Cheesman and arrangements are made so it can be run in profitable quantities by exchange at the head of the High Line Ditch during any time of the irrigation season, then the water would be of equal utility and consequently of equal worth with Lake Cheesman.

Cross-examination by Mr. Nye:

In fixing my value of $60 per acre foot, I took into consideration valuations of water supplies in the Cache La Poudre Valley, where the soil conditions are similar and the lands adapted to similar crops. The nearest point of the Henrylyn District is about 23 or 24 miles from Denver. The district is about 20 miles long. The water supply is not sufficient for the land within the district or susceptible to irrigation from its works.

There are approximately 120,000 acres of arable land that can be irrigated from the works of the district which is now equipped with main canals. It is possible by the extension of these works to reach a total of about 200,000 acres. That would require an extension of about 60 miles of main canal. Some of these additional lands have a water right but no water. I believe that the present water rights of the district may serve 30 to 40 thousand acres, about 1/3 or less than 1/3 of the total acreage under the works. In my judgment an acre foot of stored water on the lands under the Henrylyn ditches or under the High Line Canal, will annually serve an acre of land with sufficient water for irrigation. By that I mean an acre foot of water measured at the outlet of Cheesman Dam. I assumed the same duty in my valuation of the Marston Lake rights. By operating Lake Cheesman and Marston Lake together, the stored water in Marston Lake can be made equally as available for irrigation accomplishments as the stored water in Lake Cheesman.

I recognize the difficulties of exchange, for which reason I gave a little less value to the Marston Lake rights, but if they are to be used under one control and together they could be made equally
459 available. I do not know of any stored water sold on the basis of $60 per acre foot. The value in the Biiou district is $35 or $40 and in the Riverside $30. But conditions are not yet so settled in the Riverside that the value per acre foot can be determined by the selling price. There are peculiar conditions there. It would take about three years to bring a new district into a normal state of productivity, with an adequate water supply. The new land would need more water than after it has reached its full state of productivity. There would also be more return to the stream for

the benefit of appropriators below as soon as this water is distributed over the areas mentioned. As soon as that begins it relieves the stream of certain duties below which in turn relieve it above. There is a continuous change in behalf of obtaining water by such a system. That can have but one effect upon these water rights, to make them more valuable. Conditions would be changed from what they are at present. This reservoir is not filled and emptied upon lands in the vicinity of Denver every year, nor does the stream in its upper reaches have the benefit of that return. The return flow from the sewers of Denver is very small compared with the return if 100,000 acre feet from Marston Lake and Cheesman Lake were put entirely upon lands in the vicinity of Denver.

Redirect examination by Mr. Dorsey:

I said on cross examination that I did not know of any reservoir water selling for $60 per acre foot. The rights that I had in mind in arriving at that price were the rights in the Larimer and Weld Canal, combining both storage and direct flow, where the price is something in excess of $70 per acre foot of supply.

Recross-examination by Mr. Nye:

The price that I have quoted for the Larimer and Weld Canal is not the price of land and water combined, it is the price of water alone. Generally the water and land are sold together, but once in a while a water right or reservoir right is sold by one farmer to another without the lands.

Witness THOMAS CHEYNE.

Direct examination by Mr. Dorsey:

I reside in New York City. Am a certified public accountant. I am connected with the firm of Haskins and Sells with headquarters at 30 Broad Street, New York. Have recently made a study of the accounts of the D. U. W. Co. The first of the work was
460 done more than a year ago. At that time I was in Denver about 3 months. I have been here now since the early part of April nearly 5 months. Have been engaged in the practice of certified public accountant since the early part of 1905. I have made investigation of the accounts of various institutions and corporations. Exhibit Z was prepared by me. It shows the cost of additions to the system of the D. U. W. Co. from the 1907 appraisal to March 31, 1914. The data is obtained from the original sources of information. The items are properly and correctly charged as cost of additions, extensions and betterments to the property. The figures in red are credits to the accounts or deductions from the items in black. Exhibit Z offered and admitted. Exhibit A55 shows the cost of additions, extensions, and betterments to the property of the D. U. W. Co. from Oct. 18, 1894, when the company was formed to March 31, 1914, by years. The facts set forth are obtained from the original sources of information and represent the

actual cost of labor and material as shown by the original vouchers.

There is included an item of interest on a small portion of the work. In general there is no interest charged on the work. This interest charge amounts to $79,219.14 and was made on the work of the South Platte Canal and Reservoir Co. during the years of 1900 to 1903. The expense of engineering and superintendence is distributed over the accounts each year, and is so included, except for the first five months of the fiscal year of 1914, which is shown in a separate item not yet distributed. I have been unable to ascertain the cost of construction prior to the formation of the D. U. W. Co. for the reason that the books of the predecessor companies that we have do not show those costs. Offered and admitted. Exhibit A56 shows the earnings and operating expenses of the D. U. W. Co. for the 19 years ending Oct. 31, 1913 as shown by the original sources of information in the records of the company. The figures in red signify credits or deductions from the figures in black. Offered and admitted.

The total expenditures for construction shown by Exhibit A55 are $6,034,434.51. Of this item the sum of $697,700.16 is the portion of office, legal and general expense charged to construction during the period of 19 years and 5 months. It amounts to 11.6% of the total expenditure. There is no charge in Exhibit A55 for development expense. The item of surveys represents the cost of surveys for new work where the construction work has not yet been done. Exhibit A56 states accurately the total gross earnings of the company in each of the 19 years. The items charged as
461 operating expenses are in my judgment properly and fairly charged as such operating expenses. Exhibit A57 shows on the basis of the business of the fiscal year of the company ending Oct. 31, 1913 the effect upon its earnings of the application of the rate reduction ordinance. The application of these rates would have caused a reduction in the gross earnings of the company of $279,950.19 or if the schedule had been — effect, the gross earnings would have been $1,074,292.14 instead of $1,354,242.23 as they were under the leaflet schedule.

Exhibit A57 is prepared as an estimate of the business of the company for the year beginning May 1, 1914, ending April 30, 1915, on the assumption that the volume of business will be the same as for the fiscal year ending Oct. 31, 1913. In the treatment of certain items of operating expense. I have assumed that the expenses would be less than for the fiscal year ending Oct. 31, 1913. The item of legal expense in the estimate has been reduced from $45,000 to $25,000. The item of general expense has been reduced from $22,480.60 to $20,000 because I regarded the twelve months beginning May 1, 1914 as a normal period both as to legal and general expense. The estimate shows total operating expense of $333,045.06. Taxes are estimated at $120,000 because of increases due to changes in levies. The decrease in net earnings, as shown by this statement, if the rates fixed by the reduction ordinance are applied, would amount to $263,606.21.

The estimated net earnings for the 12 months period beginning

May 1, 1914, under the application of the new ordinance rates are, $640,342.65 from which is deducted an allowance of $170,000 for depreciation, leaving actual net earnings $470,342.65 also shown by the statement. Offered and admitted.

Exhibit A58 is a statement of the actual business of the D. U. W. Co. for the six months ending Apr. 30, 1914 compared with a corresponding six months period ending April 30, 1913. In the figures for the period ending Apr. 30, 1914, the item of $14,513.52 charged to loss and damage contains the cost overcoming the damage due to the heavy snow storm of December last. Exhibit A59 shows the approximate cost of the money realized by the D. U. W. Co. from the sale of bonds of the S. P. C. & R. Co. during the years 1905 to 1912 inclusive. Taking into consideration the discount and commission on bonds. It shows the amount of bonds sold each year, the net amount of money obtained for them, the normal rate of interest, and the actual rate of interest based upon the sum realized from the sale of the bonds. The final result shows that the company sold $2,923,000 par value of the bonds for which it received $2,592,387 which is equivalent to 88.7% par value. The actual average
462 rate that the company paid for the money represented by the proceeds from the sale of those bonds is 6.12% which includes a sinking fund charge to pay the discount at maturity which amounted at 5% to .478%. In the years 1901 to 1903 the D. U. W. Co. sold $1,000,000 par value of its own bonds from which it derived $963,750, equivalent to 96.4% par value.

The actual cost to the company of the money represented by the proceeds of these bonds is 5.41% and the actual cost of the money derived from the sale of both classes of bonds is 5.95% Exhibit A60 is a table showing the approximate cost of money borrowed by the D. U. W. Co. on notes during the years 1898 to 1908 inclusive. The amount of the loans, commissions and interest paid. The totals of the statements show that the company in that period borrowed $3,225,000 and that the interest rate on the loans was at the rate of 7.26% per annum.

Cross-examination by Mr. Nye:

Construction items shown by Exhibit A55 are listed there in practically the same manner as on the company's books. My reference was more to the vouchers and job orders for descriptions, but they agree substantially with the company's books. The voucher shows the job, in addition to which they have a description of the job which enables us to find out what the application of the particular expenditure was. I also obtained information concerning these items from different employes and officials of the company for the purpose of ascertaining whether the particular items were additions, extensions, or betterments as distinguished from mere replacements or repair. After obtaining this information I used my own judgment as to classification. I was unable to ascertain from the books of predecessor companies whether items charged as betterments were replacements or repairs to property obtained from those companies because such books as we have those companies do not disclose the

details of their construction. I do not know whether the item of $232,954.26 for Marston Reservoir constitutes the total cost of that reservoir or whether expense was incurred in connection with it prior to the obtaining of the property by the company.

The item Pumping Works, Capitol Hill, $17,625.21 in 1895 represents the installation of a new pump, an additional pump as I understand it. Item of $150,000 in 1899 for S. P. C. & R. Co. was for the purchase of that company's capital stock from the Mountain Works Construction Co. The money was paid for it. The item Filter Beds, Mississippi Street, was putting in some new
463 equipment in conection with those beds. The item in 1898 was in connection with the same job. The item, Third conduit, was for the initial construction.

The items in 1901-1904, Filter Beds, cover the total expense in connection with the slow sand filters. The item, Lowering Second Conduit, in 1902 $1,474.67 is properly a construction item, it was an adjustment of the system to meet changes of street grades and the cost about equals the cost of extra excavation, if the pipe had been laid deeper at first. The item of $9,777.39 for the University Park Tank, was for moving and placing the tank in another locality with such additions and connections as were necessary. The item West Denver works $32,822.77 was the construction of the Boiler house and enlargement of the barn at West Denver. The item, Improvements, Ashland Avenue works, $51,494.57 was the installation of the new Worthington pump, stack and additions to the boilers, steel tank and new building. That was an entirely new installation. The item, Capitol Hill Reservoir, $175,060.22 was for the construction of Capitol Hill Reservoir No. 2. Item, Cherry Creek Conduit, was for a new conduit in a different location than the one there previously. I think the account would be entitled to credit for the cost of the former conduit abandoned. I could not determine the amount of that. The item, First Conduit Extension, was a connection between Conduit No. 3 and Conduit No. 1, entirely new construction.

The item, Betterment University Park works, was an addition to the pump house, a new stack, and a boiler feed pump. The item, Improvements, Platte Canon Filter, was a 16 inch connection from the 7th conduit, a chloride house and a floor put in the alum house that previously had no floor. I think it is all properly new construction. Improvements Marston Lake Filers, $475 was a new chloride house. New construction. Improvements, Second Conduit was putting in a 34 inch steel pipe to replace 34 inch wooden pipe, formerly there. That was a partial replacement. I could not ascertain the cost of the property replaced, so on account of the small size of the item I included it. The amount was $6,942.36.

The next item, Betterments Capitol Hill Pumping works, was a rearrangement of some equipment in the station and the allowance was for the additional pipe necessary. I consider it a proper construction item. The next item, Third conduit, was for laying some 42 inch pipe, purchasing a right of way, and constructing a fence, probably on the right of way. The cast iron pipe took the place of

a 40 inch wood pipe. There should be an allowance there for the value of the pipe replaced. I did not know what allowance I could make. The next item, Improvements at Marston Lake, was the building of a new inlet and bridge to the flume. The old inlet
464 probably was not adequate. I called it betterments with the understanding that it was a new inlet. The item, Surveys, covers the charges made for that work in connection with projected work, some of which has been constructed but the charge not carried, to the construction account. Some of it is surveys for projected work that has not been constructed. Miscellaneous, covers some small unclassified items. I could not say it was purchasing property. Next item, is Discount and expense on Bonds sold. Amount shown there is $420,719. According to Exhibit A 59 the discount was $366,863. The difference is accounted for by the fact that Exhibit A 59 shows only the discount and does not include the expense of handling. Also, Exhibit A 59 only shows the bond sales up to 1912, there have been some sales in 1913, not included in that.

The item of Interest, is included there because when that item was charged the D. U. W. Co. treated the S. P. C. & R. Co. as a separate corporation and charged interest on construction funds advanced for its benefit. Subsequently the construction work was paid for in the bonds of the S. P. C. & R. Co. and the expense in connection with the handling of the bonds was treated as an item of the D. U. W. Co. and not charged back to the S. P. C. — R. Co. The D. W. U. Co. receives interest on bank balances, but did not receive any interest on balances arising from the sale of bonds for construction purposes. The construction work was done out of current funds before the bonds were sold and when the bonds were sold the proceeds simply reimbursed the company for expenditures. If interest is to be considered at all, the company should be allowed interest for the time they were out of the use of the money so advanced. Exhibit A 55 shows that the total expenditures for construction on Lake Cheesman were $1,107,258.30. I have not seen the contract under which the D. U. W. Co. received the $4,000,000 of bonds of the S. P. C. & R. Co. It is my understanding that the D. U. W. Co. was required to do a certain amount of construction work to be determined between the two companies. In Exhibit A 55 I have not considered any contractual relations between the companies, but have treated the plant as one system and the bonds in effect as though they were treasury bonds of the D. U. W. Co. The charge for engineering and superintendence was distributed among the different accounts, according to the extent of the work. The work was done by regular employes of the company who were on regular salaries, and operating expenses were reduced to the extent that those salaries were charged into construction account. Office, legal and general expenses are similarly divided between the two activities of the company. Some
465 were incurred for operation and some for construction. Operating expenses were reduced to the extent that those items were charged to construction. The charge varies from 10, to 12, and 15 per cent according to the extent of the construction activities.

The actual rate of interest is determined by ascertaining the

actual proceeds from the bonds sold and applying the interest charge on the par value of the bonds to the amount thus found and then ascertainmg by the use of the sinking fund method the additional allowance necessary to make good the discount suffered between the date of sale and the date of maturity of the bonds. The resulting actual rate 5.95% per annum is the actual cost to the company every year for that money. The depreciation allowance in Exhibit A.57. is not my own judgment, but that of the engineers employed by the company. It is made up of an allowance of $140,000 for ordinary depreciation and $30,000 contingent. In this statement the item legal expenses, set down as $25,000 and general expenses, $20,000 are properly chargeable to operating expenses.

Such extraordinary expense as that connected with this rate litigation would also be a proper charge against operating expenses. Exhibit A.58. shows a net decrease in net earnings of about $34,000. for the six months ending Apr. 30, 1914 as compared with the six months ending Apr. 30, 1913. There is a decrease of about $8,000 in gross earnings, an increase of $24,000 in operating expenses and an increase of about $2,000 in taxes.

I have obtained the details of the construction items shown on Exhibit A.55. regarding which inquiry was made. The expenditures in connection with the Mississippi Street galleries were for the grading of the embankment, building a fence and laying a 24 inch tile pipe from the south end of the beds to the river, all new construction. The item of $446.93 in 1898 was for the laying of a cast iron pipe across Lake Archer to replace a wood pipe. To a certain extent this was replacement. The cost of this job is probably four times what it would have been for wood. I made no specific allowance for the replacement. The rest of the item was for building a 40 inch conduit from the West Denver Reservoir along the west side of Lake Archer to a point intersecting the old conduit south of Alameda Ave. including an inlet well at the West Denver reservoir. I do not understand that that was replacement , it was all new work, done in 1906-7-8- and 1911. The item of the Platte Canon pipe line was the cost of a survey for a proposed pipe line from Lake Cheesman to Platte Canon. instead of including it with the other surveys an account was opened for that proposed line.

466 The item entitled Improvements Capitol Hill works, in 1901 was for installing a new surface condenser and pump at the pump station. A complete *now* installation. The expense in 1903 was for the installation of a new Barr pump a complete new installation. In 1907-8-9- for the installation of the new Worthington pump, additional boilers, additions to the engine room and boiler room, a new smoke stack and all necessary connections. None of it was replacement. The item Improvements at Harriman Lake was for additional riprapping and strenghtening the banks, all new construction. I obtained the information from Mr. Hawes and from the job orders.

The item for the Platte Canon Reservoir, 1903-04, covers the construction of the reservoir complete, including site, pipe, lines, bridges, and all the appurtenant works. Also, part of the expense

of constructing Filter Beds, 4, 5, 6. So that my statement that the other item Filter Beds, covered all that construction was not correct. The items, in 1906-7, represent the construction of the power house, installation of machinery, building of the office and cottages, the sewerage, and steam heating systems. These items are all for new construction. They really are not properly classified under the heading Platte Canon Reservoir. But that is the classification they have used for it. The item, Fourth Conduit, represents the surveying and first material purchases for a conduit then called the fourth conduit, which is now known as the 6th Conduit. That was projected in 1906 or 1907 then work was stopped for a year and resumed again in 1909. The charges under the fourth conduit ought to be added to the 6th conduit as now known.

The next item, Betterments of University Park Works, was the enlargement and improving of a Booster station at that point, consisting of the installation of a second hand boiler, a new boiler feed pump, stack, additional suction and discharge pipes, and a new iron clad building. That was all practically new work. There had been a little shed there before, housing a gasoline engine, but it did not amount to anything. I have made no further investigations of the replacement of the wood pipe on conduits Nos. 2 and 3. And have made no allowance in these figures for the replacement. The principal item of the special assessment taxes, was against the old pump station at 15th and Bassett sts. That property has since been sold and the proceeds are credited into this statement in the item of material and property sold, as is also another item in the same year for a storm sewer tax on lots in West Denver. The following year was the 14th St. viaduct tax against lots in Highland park and Cottage Hill, $461.68. The next item in 1905 was $193.95
467 Highlands Sanitary Sewer tax on lots in Cottage Hill. (Detail of other small items of special taxes.)

I have obtained the figures that you requested yesterday showing the amounts of office, general and legal expenses charged to operation, and construction accounts, respectively from 1895-1913. They are detailed on a sheet Marked Defendant's Exhibit 17. It would make no difference in the facts set forth in Exhibit A.59. if the bonds of the S. P. C. & R. Co. were obtained by the D. U. W. Co. on a basis of 80%. The figures there represent the difference between the face of the bonds and what the system or the two companies combined realized for the bonds, which have to be met at maturity at par. I have eliminated entirely in the accounting all inter-company transactions, and consider the two companies entirely as one. And the figures there set forth will be the cost to the system represented by those two companies when the bonds mature.

As I understand the determining of the value of the D. U. W. Co. property for the fixing of rates, it involves all of the property that is used in operation and the property of the S. P. C. & R. Co. is just as much used in the operation of the D. U. W. Co. as the property which it owns itself. And if we had allowed the expenditures of 80 we will say to equal the proceeds derived from the bonds at 80, we would have eliminated from this construction statement all

of the items applicable to the S. P. C. & R. Co. and then they would have been set out on a separate statement, to which would have been added the 20 per cent loss which it suffered by reason of the sale of its bonds at 80 to the D. U. W. Co. So that it is about as broad as it is long, with this exception, that in that case you would have had the discount on the bonds based upon a contract between two allied companies. And in the statement as prepared, you have only charged in the discount that which was actually suffered by the two companies combined in dealing with the public. I examined into the distribution of the bonds and stock of the D. U. W. Co. as distributed at the time of its organization. The distribution is divided into two parts, one to the Citizens' Water Company and the other to two or three men, a bondholders' committee, I understand. The books simply show the distribution of so much in securities for so much property. The cost of property to the D. U. W. Co. would be the securities issued. There are fragmentary records of the securities issued by some of the predecessor companies. The books of some of the predecessor companies cannot be found. As to the million dollars of bonds remaining in the treasury of the D. U. W. Co. at the time of organization they were disposed of and the proceeds used for construction. They were sold in the years 1901-
468 1902-1903. $500,000 par value sold at 95 June 18, 1901. $250,000 par value sold at 97½ Jan. 11, 1902 and $250,000 par value sold at 98 Jan. 15, 1903. The company had previously made the expenditures out of its own funds and reimbursed its treasury by the sale of bonds.

There is no distinction made between bond money and money from operations in the accounting. It is simply carried as cash in the treasury. The income of the company from interest on bank balances was not a considerable item, probably two or three thousand dollars a year. Its bank balances fluctuated considerably. There were times when they got down pretty low. That is when they had to borrow money on notes to help them out. The construction expenditures were always in excess of the proceeds from the sale of bonds. They were constantly drawing upon their income from operation, except just at the time at which they received a lump of money from a sale of bonds. I did not attempt to ascertain the percentage charged to the different accounts for engineering and superintendence. It can be compiled from the accounts, but you cannot turn to any one page of the books and get it. I did determine that the distribution through the different accounts was proper and examined the vouchers to see that the amount in question had been distributed. It was just the ordinary expense of engineering and superintendence accumulated either for a month or a year and then distributed pro-rata to the accounts in the relation that the direct charges to those accounts bore to each other. I made no attempt to ascertain the percentage basis of the distribution. The method of checking that I used is a proper one and commonly used.

Redirect examination by Mr. Dorsey:

Three dividends of 5% each on the par value of its outstanding stock have been declared by the D. U. W. Co. in its history. The cost items for construction shown on Exhibit A.55. were all incurred after the organization of the D. U. W. Co. Oct. 18, 1894. That statement would not show any costs incurred in respect to any of those items prior to Oct. 18, 1894. As to Marston Reservoir, regarding which I was asked on Cross examination, I am informed that a considerable portion of the work had been done prior to Oct. 18, 1894, but there is no record to which I can go to find out what that amounted to.

Assuming that Marston Lake Reservoir was commenced in 1893 the costs for that year and for 1894 up to Oct. 18, would not appear here. The same is true of the mechanical filters and all other items of property constructed prior to that date. I do not know whether there is any other case on the works where the construction
469 accounts overlap as they do on the Platte Canon reservoir and the filter plant, but undoubtedly there are some where the work is closely allied. I understand that Messrs. Metcalf and Anderson in making their valuation, followed each of the separate works apart from the others. If they have done that their classification would be different than in Exhibit A.55. In preparing Exhibit A.55. I have made no deductions for depreciation and no additions for appreciation. The company in its bookkeeping has done neither.

No allowance is made for depreciation in arriving at the net earnings shown in Exhibit A.56. The portion of office, legal and general expense that is chargeable to construction depends entirely upon the company's construction activities. If construction activities are the major activities of the company then most of the charges to this account will be distributed to construction account. It will not exceed 15% of the total expenditures for labor and material for construction. The distribution of that account is not material, however, because if it is not charged to construction it is charged to operation and results in that much greater reduction in net earnings for the year. There were $189,000. of the bonds of the S. P. C. & R. Co. sold by the D. U. W. Co. in 1913 which are not included in Exhibit A59. The average price received for them was about 88.

If the discount on the S. P. C. & R. Co. bonds had been figured at 20% because of an inter-company transaction, it would have increased the total discount that would have been accounted for by two statements necessary in place of Exhibit A59 by about 8.7 cents on the dollar par value of bonds over the discount shown by the system statement as submitted. Exhibit A59 was prepared on a calendar year basis and Exhibit A55 on a fiscal year basis. The special assessment taxes are for improvements to the property and for that reason are properly chargeable to construction account.

Exhibit A58 shows the operations of the company on the basis of the leaflet schedule. In Exhibit A59 only the actual discount on bonds is considered. In Exhibit A55 discount, commissions, and all other expenses incidental to the handling of the bonds are con-

sidered. Exhibit A60 covers all of the note issues made by the D. U. W. Co. during its history.

Recross-examination by Mr. Nye:

I examined the accounts of the company with respect to the payment of dividends in 1905-06 and the dividends were justified by the financial condition of the company. If the S. P. C. & R. Co. was charged with 20% discount on its bonds by virtue of the sale to the water company, and the water company sold them at a price
470 in excess of 80, it would have credited the difference to profit and loss and it would not be a credit to construction account in any way, if the operations of the two companies were entirely separate. In that case the water company would simply have operated as a contractor doing the work.

In considering the items of special assessment I treated them as being upon property used or useful in supplying the City and County of Denver and its inhabitants with water. As to the securities issued by the D. U. W. Co. at the time of its organization I had no means of determining whether or not those securities were disposed of in settlement of actual expenditures of money theretofore made.

It is my recollection that the proposition of sale just offered certain property belonging to a certain company in exchange for certain bonds and stock.

Redirect examination by Mr. Dorsey:

And that is how all these $7,000,000 of bonds originally issued and all of the capital stock of the water company came to go out, in payment for the property acquired in 1894. Both the principal and interest of the bonds of the S. P. C. & R. Co. are guaranteed by the D. U. W. Co.

Witness ADELBERT A. WEILAND.

Direct examination by Mr. Dorsey:

I reside at Pueblo, Colorado. Am a civil engineer. Received my education at the University of Colorado, at Boulder. Have been engaged in engineering work since 1901, when I was Hydrographer for the Arkansas Valley Ditch Association. From 1905 to 1907 was Hydrographer for the United States Geological Survey. In 1907 was employed by the Colorado Fuel & Iron Co. as hydraulic engineer in charge of their water system at Pueblo. Resigned in 1910 to accept the position of Chief Engineer of the Arkansas Valley Ditch Association, which position I now occupy. The Arkansas Valley Ditch Association is an organization of 20 of the largest ditches in the Arkansas Valley extending from Fremont County to the Kansas State line. My chief duties are to look after the flow of the Arkansas river, assist in the distribution of the waters of that river to the various canals and work up all records of stream and ditch flow and look after the engineering matters in connection with liti-

gation affecting the interests of the ditches. That work has
471 made me familiar with the ditches and reservoirs depending upon the Arkansas River for supply, with the regulations and distribution of water to the various appropriations and with the value of water rights in the Arkansas Valley. I am familiar with Lake Cheesman and have visited the reservoir and inspected the dam for the purpose of determining the nature of its construction. A stream bed reservoir, because of its location, can take advantage of the total stream flow, whereas, a reservoir fed by a feeder canal is limited to the capacity of that canal and misses the peaks of many floods.

The cost of operation and maintenance of Lake Cheesman would be much less than the cost of operation and maintenance of most reservoirs. Lake Cheesman is located above the City of Denver and above the intakes of all ditches to which it may be desired to apply water, enabling the natural channel of the stream to be used as a carrier from the reservoir to any ditch selected.

Assuming that the total capacity of Lake Cheesman is 79,064 acre feet and its capacity to deliver water is as has been testified here by one estimate, 57,016 or by another 64,000 acre feet over a period of 15 years (1900 to 1914) without failure or 70,000 acre feet per year for all except four years out of the 15 (of which efficiency 1 yr. 95%, 2 yrs. 85% and 4th year 75%), it is my judgment that on a basis of an average delivery of 60,000 acre feet it is worth at least $65 an acre foot or in the aggregate $3,900,000. I arrive at that judgment by comparison with water right values in the Arkansas Valley at the present time. Taking into consideration that as to some of those water rights the comparison is not a just one because I consider Lake Cheesman a much more valuable proposition than most of the water rights that I have analyzed. Due to the fact that the application of water at the doors of Denver represents a higher utility and higher value than under some of the systems of the Arkansas Valley. Many of these systems are a long distance from any town and from any market. I have made a careful study of the irrigation systems in the Arkansas Valley for another purpose in which I have determined the total value of all of the systems. Also a study of the average diversions of each of the canals and in arriving at my basis per acre foot I have taken the value of each of these propositions after water was applied to it, and deducted from that the value of improvements and of the raw land without water and divided that figure by the average number of acre feet diverted annually. The analysis shows, considering 8 typical canals, some with good and some with indifferent water rights, an average
of $61 an acre foot, based upon the records of actual diversion
472 through these systems. The average annual diversion of water in the Arkansas Valley, considering winter and summer diversions, is 3 acre feet per acre. In my judgment that is more water than is actually needed.

The lowest annual diversion in acre feet per acre is under the Colorado Canal that has its storage in the mountain reservoir known as Twin Lakes, its diversion is 1.34 acre feet per acre. The value per acre foot of the Colorado Canal figures $82.13. I consider that

system to be more nearly comparable with Lake Cheesman than any other in the Arkansas Valley. I consider 2 acre feet per acre sufficient for proper irrigation in the Arkansas Valley. If the diversions were on that basis it would increase the average value of water under these systems from $60 to $90 an acre foot. I stated that the water of Lake Cheesman was worth at least $65 an acre foot but I see no reason why it should not be worth at least as much as the water right that shows the highest value in the Arkansas valley or $82 per acre foot. That is the Colorado Canal, which has the Twin Lakes for storage. The water of Lake Cheesman is available at all times and can be had when most needed. I am assuming that the water of Lake Cheesman can be used on lands in the immediate neighborhood of Denver. That is within 30 or 40 miles. The price that I have applied is the price at the reservoir. Purchaser to pay the cost of transportation and bear the loss in transit. I am familiar with Marston Lake, another reservoir of the D. U. W. Co. Assuming that by the use of the reservoir in conjunction with the Bear Creek and Platte Canon supply, it is capable of delivering 40,000 acre feet during the irrigation season each year, all deliverable as stored water, I would put the same value on the 40,000 acre feet as at Lake Cheesman or $65 per acre foot at the reservoir.

Cross-examination by Mr. Nye:

I did not estimate any duty for the water at Lake Cheesman. But I would say that one and one-half to 1¾ acre feet would produce good results. I assume that the burden of providing a distribution system would be upon the purchaser of the water at the reservoir. I am assuming that there will be customers for all that water, and that the customers would be able to build their own diversion system. I am not familiar with sales of water in the vicinity of Denver. I do know of sales in the Arkansas Valley, and I consider whenever there is a transfer of land at the prices at which land is currently selling that the buyer is actually paying $61 per acre foot for every acre he buys in the Arkansas Valley.

I arrived at these values by ascertaining the value of the works of the irrigation projects, deducting therefrom the value
473 of the raw lands and the improvements on the land which leaves the value due to the application of the water. Into this I divide the total acre feet diverted by the project which gives the value per acre foot. In the case of the Bessemer Canal this value is $57.50 per acre foot. There is no storage connected with this canal. It waters about 20,000 acres. These valuations were not made for the purpose of this case but for the purpose of a proceeding in the Arkansas Valley.

I had charge of the work of valuation for the Arkansas Valley Ditch Association and had such assistants as I needed. It was my report and my determination. The work was started in 1911 and has been kept up to date. I don't think the D. U. W. Co. knew anything about it until just now. In making my determination of values for the waters of Lake Cheesman I assumed a positive annual efficiency of at least 60,000 acre feet and assumed ownership and

control of that water by the D. U. W. Co. If it should appear that the annual efficiency of that structure was only 20,000 acre feet, the water would still be worth $65 per acre foot at least.

As to Marston Lake I assumed a delivery from the reservoir of 40,000 acre feet. I know that the reservoir itself has not that capacity. I assumed that the difference between the capacity of the reservoir and the 40,000 acre feet would come from sources other than the reservoir capacity. I did not assume any value for the land near Denver to which the water would be applied. The values that I fixed in the Arkansas Valley are borne out by actual sales of land. I know also of sales of water independent of land. The water from the Bessemer Canal sells for $110 per share, representing the water for one acre. On the basis of two acre feet actually applied, it makes the value $55 per acre foot. Colorado Canal stock is worth $60 per share for one acre, at an average diversion of 1.34 acre feet, its value per acre foot is $44.80. The High Line stock is worth $900 per share representing 10 acres or $90 per acre. They divert 2½ acre feet and assuming a 2 acre foot application gives $45 a-acre foot. The Fort Lyons Canal stock is $65 a share for 1 acre with a total diversion of 1.87 acre feet and during irrigation of 1.37 acre feet which gives a value per acre foot of $47.50.

Redirect examination by Mr. Dorsey:

The investigation that I made in the Arkansas Valley required me to determine as a matter of my own judgment the value of the land with and without water, and the value of the improvements thereon and the value of the water right itself. It related to the ascertainment of the market value of the various kinds of
474 property. I have no complete or accurate knowledge of the lands in the vicinity of Denver, though I know about them in a general way.

In my judgment irrigated lands in the vicinity of Denver should command a higher value than in the Arkansas valley. In my valuation of the water stored in Lake Cheesman I have included the value of the structures. I valued the property as an entity. The Colorado Canal irrigates an acreage of 56,000 the gross value of the property is $7,000,000. Taking out the value of the lands without water and improvements leaves a net value of $6,060,000. The average annual diversion is 75,000 acre feet, giving the value per acre foot of $82.13.

If anyone were attempting to acquire all of the water rights of the systems concerning which I gave information as to stock value, he could not acquire them by purchasing the stock, but would have to purchase, as well, all of the lands, water, improvements, and physical structures. In the case of the Colorado Canal system he would have to pay the market value, which I gave here, $7,000,000 and not the value of the stock at $60 per share. If he wanted the water only he would be required after making his purchase to take the water from the land and then dispose of the improvements and land without water.

When this was done it would leave a value for the water of $82.13 per acre foot. The lands irrigated by the Colorado Canal, begin about 40 miles east of Pueblo and continue east for about 20 miles.

Witness HENRY P. ELLIS.

Direct examination by Mr. Dorsey:

Have lived in Denver 26 years. My business is loaning money on real estate and mortgages. Have been engaged in that business 27 years. Have loaned money on all kinds of property, town, business and farm property. Loans are made for clients mostly. The prevailing rate of interest on downtown property is 6% on 5 year loans in connection with which is an additional expense of 2% commission and the usual attorneys' fees and recording and abstracting. Such loans are made on a basis not exceeding 50% of the valuation of the property. On residence property some loans are made on a basis of 60 or 70 per cent of value but I do not like to loan over 50%, insurance companies run as low as 33%. The rate of interest is also 6%. The prevailing rate of interest on farm loans is 7%. On farm loans the same margin of security is required as on city property. The borrower pays the commission and expenses. My commission never exceeds 3% on a five year farm loan out of
475 which I take care of my local agent. Some people get higher rates, 7% interest and 3 to 5% commission out of the loan the first year for farm loans. Commission on city loans never exceeds 2%. My business now is about $600,000 a year. It has run as high as $800,000 for the last 17 years. About 17 years ago the interest rates were 8%. At that time farm loans ran from 8 to 10%. Interest rates began to decline in 1897.

Witness JOSEPH C. HOUSTON.

Direct examination by Mr. Dorsey:

Have lived in Denver 26 years. Am asst. cashier of the First National Bank. Have been in the banking business in Denver for 25 years. Am familiar with bank loans, security required, and its extent and relation to the amount of the loan. The prevailing rate of interest on bank loans is about 6½ per cent. We have some loans drawing 7 and 8 per cent and some as low as 5 and 5½ per cent. That average has existed for the last two or three years, but under present conditions it may increase materially in the near future. Banks usually aim to get collateral security of at least twice the amount of a loan. Loans are sometimes made upon personal security with indorsement and also upon the financial standing of the party himself without security. In those cases we figure the quick assets of the borrower against liabilities on the same ratio as collateral security, 2 to 1. The average loan period is 90 days. The average interest rate in 1894 was about 10 per cent. The 6½ per cent rate has been in vogue for the last 5 to 8 years. The decline from 10 per cent in 1894 was a gradual decline. Years back loans were made more upon personal indorsements, no com-

missions are paid by the borrower obtaining loans from the bank. When we can we discount the loan collecting the interest in advance, giving the customer the balance. That makes the actual cost of the money to the customer higher.

Cross-examination by Mr. Nye:

I have not considered the advance interest payment in arriving at the average rate of 6½ per cent. Exhibit A.4 offered and admitted.

In the course of an argument in support of defendants' application for a continuance, Mr. Stevens, City Attorney and of counsel for defendants, said in part:

"Another thing that must be borne in mind in this whole procedure is that it" (the ordinance under attack) "was not
476 an ordinance passed by the city council of the City and County of Denver; it was an ordinance initiated by the people of the City and County of Denver, and the council had only one duty to perform under the charter, and that was to pass it without any question of any kind or character." * * *

Mr. Dorsey: "Do you mean to say that the council of the City and County of Denver passed this ordinance without any determination as to whether it was reasonable or not?"

Mr. Stevens: "Absolutely. They had no discretion in the matter. The charter says that when these measures come before the city council that within a certain time they shall submit them to the people; but this, as I understand it, was initiated and presented to the council under the section which provides that, when presented with the signatures of a sufficient number of the citizens of Denver, it is mandatory upon the council to pass it. In any event, that was the view that the council took of its duties."

By agreement of Counsel Exhibit A.59, withdrawn and a new exhibit A.59, containing information as to bonds of the S. P. C. & R. Co. sold in 1913, admitted in its stead. As the detailed testimony of Mr. Cheyne on that subject.

Witness MILTON SMITH.

Direct examination by Mr. Dorsey:

Am an attorney. For the past 20 years have been associated with irrigation matters in the vicinity of Denver, and very actively since 1900 or 1901, beginning with the investigation of a plan to divert waters from the western slope. In 1902 participated in the organization of the Farmers Reservoir and Irrigation Company for the development of the Standley Lake project. Have had to do not only with the legal work but as a director and officer of the irrigation companies and the companies associated therewith. Am familiar with the value of water rights in the vicinity of Denver and with the lands irrigated and unirrigated, particularly those which are or may be irrigated from the South Platte river with waters available above Denver. I know the location of Lake Cheesman but have never visited the reservoir. Assuming that the actual

capacity of Lake Cheesman is 79,064 acre feet and its capacity to deliver water is as has been testified to here, by one estimate 57,016, annual average 1899 to 1914, or by another 64,000 acre feet, per year, over a period of 15 years without failure, or 70,000 acre feet per year for all except 4 years out of 15 (of which, efficiency
477 1 yr. 95%, 2 yrs. 85% and 1 yr. 75%). It is my judgment that the value of that water is $75 per acre foot for whichever quantity or any of them that experience shows are available for delivery. I would apply the value of $75 per acre foot to the 70,000 acre feet considering that those failures are merely nominal, they amount to nothing. I know where Marston Lake is and what it is. Assuming that by the use of Marston Lake in conjunction with the Bear creek and Platte Canon water rights of the D. U. W. Co. there can be delivered in each irrigation season, 40,000 acre feet in the same manner that stored water is delivered. It is my judgment that the 40,000 acre feet are worth $75 per acre foot the same as Lake Cheesman. It does not make any difference whether the capacity of Marston Lake is acutally 40,000 acre feet if in the practical operation of it there can be delivered through it or by means of it 40,000 acre feet of water. There is sufficient land in the vicinity of Denver now unsupplied or inadequately supplied with water to use many times the quantity of water available from these reserviors. As a matter of fact, the Farmers Reservoir and Irrigation Company could use every acre foot of it through canals which they now have constructed to supply lands under the canals which at this time have no water.

These are not the only structures through which the water could be used. The High Line Ditch could use it.

Cross-examination by Mr. Nye:

The average duty that I would assign to this water is 1 acre foot per acre. Some time ago I tried to buy water for a farm near Loveland which was quoted at $75 per acre foot and when I went back to get it it had been sold. I have heard of a great many sales at that price, but have not participted in any. The selling price of water in the Standley Lake system is $50 an acre foot. The system is running water and selling water rights. The sales are on an acre foot basis. One share of stock is entitled to its pro rata share of our supply up to 10 acre feet, the price per share is $500. The price assigned is the price at the reservoir, consumer to pay the carrying charges. The loss in transit between Lake Cheesman and Denver would be comparatively small.

There would not be the slighest trouble in disposing of these water rights. The farmers would all jump at the proposition of getting water out of Lake Cheesman. I have included in the price of $75 per acre foot the fact that the structures are there to retain and store the water. The water possesses that value for irrigation purposes. I have not considered any element of value be-
478 cause of its being used or useful as a domestic supply. Essentially this water would be worth as much to the farmer operating near Fort Morgan as to the farmer operating near

Brighton. There might be a slight difference but not much. One element would be slightly more loss in transit, and the other a question of the return which the farmer would get from his crops that far from Denver, but that is not very much. I eliminated the cost of carriage practically because I think the water is worth that at the reservoir. The route of carriage from Cheesman Lake to Fort Morgan is through the channel of the South Platte River. There isn't very much cost to that or very much loss either but there is some. The loss is also small as compared with what he wastes under the present system of farming and if he saw an opportunity to get this class of water he would jump at it in a minute if he wanted water.

I don't think the loss between the outlet of Lake Cheesman and the head of the Fort Morgan canal would exceed 3% during the irrigating season. I know that that disagrees with some engineers and with the state authorities, but theory is one thing and practice another, and when you have observed it for a number of years, nine times out of ten it safter to go on practice. In my judgment the practice is that you wouldn't lose more than that unless somebody stole your water. I think it is a fact that the state authorities always charge more than 3% loss in the transit of water, I think they run from 5 to 15%.

Redirect examination by Mr. Dorsey:

I think the water is more valuable for the use to which it is now applied than for use for irrigation. In selling water rights under the Standley Lake system, they have been sold on the basis of delivery in the average season of 210,000 acre feet of water. There are 21,000 shares outstanding, 17,000 shares are definitely fixed to land and 4,000 shares have not yet been sold to individuals. The system has not been in operation for a period of 10 or 15 years so as to have demonstrated that it is capable of supplying that amount of water each year. If it had been I would insist on the price of their water being raised to $750 a share instead of $500.

In a new and untried system you never can get the same price for water as in the system that has been tried for a number of years. So far as the price which I fix is concerned. It is based on the assumption that there has been so much water available for delivery and it has been demonstrated for this number of years, that explains the difference in the value of water in that system and in the Farmers system. In the Standley Lake System, the owner of one share of stock is entitled to an amount of water
479 furnished from all the sources of supply of that system in combination, which is equal to 10/210,000ths of the total not exceeding an allowance to the owner of each share of 10 acre feet in any event.

480 In the District Court of the United States for the District of Colorado.

In Equity. No. 6274.

THE DENVER UNION WATER COMPANY, Plaintiff,
vs.
THE CITY AND COUNTY OF DENVER et al., Defendants.

Abstract of Defendants' Testimony.

JOHN F. HEALY, a witness for the defendants.

Direct examination by Mr. Stevens:

Witness is now and has been chief of fire department since August 1, 1912; has been connected with fire department since September 1, 1894, in various capacities, except for period of about two years, in 1895 and 1896.

During the past summer made special tests of company's plant for determination of fire pressure, and has continually observed pressure in the discharge of his duties.

In June last, in company with Master Mechanic Mason, made pressure tests covering two or three weeks in the month; tests made at hydrants close to hospitals, schools, state institutions and similar places; tests made with pressure gauge; flow pressure taken with Pitot tube.

Hydrant at 19th and Pearl, static pressure 42½ pounds; flow pressure, with one-inch tip, 40 pounds; with one and one-half inch tip, 40 pounds.

481 Witness has attended all fires of any magnitude occurring in city since April 1, 1903.

Knows about the storage systems of the company about the city; has no technical knowledge of source of supply and size of the mains other than that gained from reports of National Board of Fire Underwriters of 1906 and 1910.

(Plaintiff's objection as to opinion of witness on adequate pressures overruled.)

Based upon practice, thinks 100 pounds' pressure in business district and 75 pounds outside would be adequate. Pressure at St. Luke's hospital 42½ pounds; would require total pressure to get the water at the end of a 400-foot fire line with one-inch tip; loss of 10 pounds to 100 feet; requires 43¾ pounds to raise the water 100 feet.

Should have at least 80 pounds pressure at the nozzle.

Plenty of water in the main for more than one fire engine.

Supply of water adequate.

Test at 18th and Franklin, static pressure 30 pounds; flow pressure, with one and one-half inch tip, the same; sufficient volume, but pressure lacking, this demonstrated by the fact that there was no

difference between static and flow pressures; 17th Ave. and Milwaukee, static pressure, 110 pounds, flow pressure with one-inch tip, 80 pounds; pressure adequate, although it dropped to 80 pounds with one-inch tip; 50 pounds with inch and a half tip. 14th and Marion, static pressure, 70 pounds, flow pressure 50 and 35 pounds; 13th and Clarkson (Wolfe Hall) static pressure, 30 pounds, flow pressure 30 pounds.

12th and Clarkson, static pressure 25 pounds, flow pressure 25 pounds.

8th and Pennsylvania, (near Campion and Cheesman residences) static pressure 30 pounds, flow pressure 30 pounds.

1st and Franklin, static pressure 45 pounds, flow pressure 40 pounds.

Warren Ave. and University St., static pressure 25 pounds, flow pressure 20 and 15 pounds.

State Home for Dependent Children, Iliff Ave. and So. Washington, static pressure 25 pounds, flow pressure the same.

At County Hospital, 6th and Cherokee, static pressure 55 pounds, flow pressure the same.

19th and Stout, static pressure 65 pounds, flow pressure 60 pounds.

38th and Boulevard F, static pressure 20 pounds, flow pressure 17 and 15 pounds.

42nd and Lowell Boulevard, static pressure 45 pounds, flow pressure 35 and 25 pounds.

482 38th and Tennyson, static pressure 45 pounds, flow pressure 40 pounds.

West Colfax Ave. and Wolfe, static pressure 30 pounds, flow pressure 25 and 15 pounds.

36th and Gilpin, static pressure 70 pounds, flow pressure 65 pounds.

34th and York, static pressure, 25 pounds, flow pressure 17 and 10 pounds.

12th and Quebec, static pressure 45 pounds, flow 40 and 34 pounds.

Colorado Boulevard and Colfax, static pressure 100 and 25 pounds.

Pressure depends upon gravity.

Witness describes reservoirs and pumping systems which take care of pressure for the city. 100 pounds pressure in business district and 75 pounds pressure outside will take care of fires without question. Knows about pressure in other cities, from reading.

(Objection to testimony by witness as to pressure in other cities overruled.)

Witness informed that Croton system delivers water at top of 10-story building at 85 pounds pressure.

Witness informed that Croton system delivers water at top of 10-story building at 85 pounds pressure.

(Motion to strike not ruled on.)

Says pressure in down-town district received from pumping plant

in West Denver, and there is a loss of from 15 to 20 pounds in district between 16th and 17th Streets from Broadway to the depot, and to secure 100 pounds pressure at that point, would require 115 to 125 pounds at the pumping plant.

Made test at Depot about first of July; hydrants at 16th and Wynkoop and 18th and Wynkoop gave 65 pounds static and flow, showing a large main at that point.

All tests made by witness showing pressure under his estimate of 100 pounds for business district and 75 pounds for outlying district, inadequate for service without fire engine.

Referring to book gotten out by Fire Underwriters, says minimum of 50 pounds pressure at nozzle is necessary.

In instances where tests showed sufficient pressure, flow was short.

Pressure is desirable in fighting fires, to give driving quality to stream; a driving stream is more efficient than one which merely throws water on fire.

If fire can be extinguished at incipiency, less damage is done; hose wagon invariably precedes engine at fire.

There are places in Highlands and South Denver where water supply insufficient for first-size fire engine.

483 On September 28, 1912, at zinc works fire, 800 feet of hose was used on hydrant at Cedar and Broadway, and suction collapsed.

On February 14, 1914, at 1218 Clarkson, extinguished fire with garden hose attached to 250 feet of fire hose.

Adapters are carried to reduce size of stream when necessary, to complete the extinguishment of fires; give better pressure.

In opinion of witness, if company's mains were 8-inch, and water delivered at 10 to 15 pounds static pressure at the hydrant, there would be sufficient water for all fire engines required.

Witness thinks if the mains were 8-, 10-, and 12-inch, and honeycombed together with hydrants on every corner, there would be plenty of water, but would need fire engines.

Difficult to catch fires in incipiency with fire engines.

With fire engine, it requires 15 to 20 minutes to get 100 pounds pressure at the engine.

Cross-examination by Mr. Dorsey:

Witness is a building mechanic; has learned and worked at the plastering trade; knows nothing about the construction and operation of water works systems, except what he has learned in regard to pressures and the kinds of streams required to extinguish fires.

Witness thinks he knows how the pressure is obtained and maintained in water works system.

Says the pressure for entire business district is supplied from West Denver pumping plant, Capitol Hill pressure supplied from reservoir at 11th and Clayton, Montclair by the booster plant at 29th and Albion, and University Park by a booster plant.

Has some doubt whether West Denver pumping plant would maintain pressure without aid from other parts of system; thinks that if

there were enough tanks at 29th and Sheridan Boulevard and larger reservoir at 11th and Clayton, down town pressure could taken care of by valves, and the West Denver plant done away wi

Says Capitol Hill reservoir might have something to do w pressure in down town district, but bases this opinion upon inform tion given by engineer at the West Denver pumping plant and reading Goldsmith's report.

Would not undertake to advise how a plant should be desig to furnish water; does not think the north Denver reservoir is a good; thinks it has nothing to do with the pressure.

484 Ashland Avenue reservoir is much higher than 16th a Arapahoe, and the tanks are higher than the reservoir.

Elevations at different parts of the city vary a great deal.

Witness does not know that the Ashland Avenue reservoir anything to do with the pressure of water in the pipes in the do town district.

Witness does not know how the Capitol Hill reservoirs are c nected up with the system. Does not know whether his duties chief require him to know about the water plant and how it is c nected up; has tried to find out some things in order to ans questions asked by the public; knows more about the plant than previously.

Witness details in general way his knowledge of the system, wh is confined mainly to source of supply.

In estimating 75 pounds pressure for "outside districts" wit means territory east of Broadway, north of Platte river, east of S Street, west of Colfax Avenue; 75 pounds static pressure in th districts would enable department to fight 99 out of every 100 without use of engines.

With 100 pounds static pressure in business district, could out incipient fires without engines; so-called out-side district co country variable in elevation.

Thinks that to maintain 75 pounds pressure at every hydran the territory, it would be necessary to build reservoir in Cla Addition, one in Montclair, South Denver tanks would have t elevated, and something would have to be done on the North S thinks all of Clayton addition and district east of City Park Park Hill could be taken care of by reservoir in neighborhoo Clayton College.

Does not know whether various storage structures would hav be connected up; does not know whether present Capitol Hill r voir is higher than Clayton College; thinks that in such a sy as witness has in mind, 75 pounds pressure should be maintain the low points.

Thinks it is a debatable point whether it would be necessa maintain a pressure higher than 75 pounds at the low poin order to keep a uniform pressure of 75 pounds throughou district; thinks that if the pipes would stand it, a pressure o pounds would do no harm.

Would not know whether it would be possible to mainta pounds pressure in a gravity system uniformly throughout th

side districts; would know nothing about designing such a system or constructing it. When asked if, in the present system, a pressure of 75 pounds were maintained at the Capitol Hill reservoir, there would not be a much greater pressure at Broadway, witness expressed opinion that there would be if there were not a number of outlets to diminish the pressure. Can give no idea what it would
485 be; does not think high pressure would interfere with plumbing for domestic uses.

Has knowledge of other cities which he has visited, in additions to reports of their assistant fire chiefs, where city mains carry more than 100 pounds pressure and are used for both domestic and fire-fighting purposes.

Does not know how much greater than 100 pounds ordinary plumbing would stand.

Thinks that when mains are connected together around every block, pressure would equalize itself.

Knows that in New York, Boston and Philadelphia, and a large number of other cities, they have a high-pressure system for fighting fires, and are doing away with fire engines, and maintaining a static pressure of 300 pounds for fire purposes. In all cities where they haven't a separate fire pressure, they use fire engines, although a great many cities have 75 and 100 pounds' pressure. Where engines are used, the question is not so much one of pressure as it is of the volume of water available; the volume of water is the main thing.

Has a big list of fires where there was trouble for lack of water, but there was no blame to the company, because mains were not owned by it. Witness' experience indicates that water company mains are much larger than 6 inches. There are some places where there are long leads of 6-inch pipe that will not supply fire engine, but they are very few, and mostly in outlying districts, and a few dead ends in the business district. Witness knows of but one fire down town where there was trouble with water supply; the incident occurred ten or eleven years ago; there was not water enough in the main for two engines.

Considering the fact that fire engines are used in Denver, and speaking generally of that part of the water system which belongs to The Denver Union Water Company, a satisfactory volume and adequate supply of water for fire purposes is furnished, except in a few instances in outlying districts; fire engines have been used for over twenty years. Should have four hydrants at every street intersection in down-town district.

Would not abandon use of fire engines if pressure was 100 pounds static pressure and 75 pounds static pressure outside. With pressure as it exists, many fires are put out without engines.

Witness describes location of chemical equipment.

The city fire department is too small; is lacking in men, money and apparatus.

The fire loss in Denver in 1913 was $1.12 per capita, which is very low for a city the size of Denver; only one other city that
486 year that was close to it; there have been some bad years. Denver is in third class in rating by insurance companies,

even though the fire loss is small; it has never reached over $600,000 in one year.

The fire loss in 1913 was less than it has been for seven or eight years.

To adequately equip the fire department it would cost $250,000. With a $250,000 investment in the fire department witness would be in as good position to fight fires with present pressures as he would be with the fire department as at present equipped and the static pressures of 100 and 75 pounds, respectively.

Pressure tests testified to were made in the month of June. There were pressures taken in 1906 and 1910 by the Fire Underwriters, and years ago Roberts, who was then chief, maintained a recording gauge. The pressure is now less, generally speaking, than it was when witness entered the fire department.

In former times the pressure was 85 and 90 pounds in the business district, and it is now 65 pounds. These pressures are now less than they were in 1895. Witness took static pressure in Union Pacific shops in 1903, and got as high as 110 pounds; thinks he cannot get that now.

The flow pressure at the depot is 65 pounds.

Witness has testified to all hydrants that were tested in June: witness picked out the locations.

The volume at St. Luke's hospital was adequate.

There are not sufficient hydrants in the city for fire-fighting purposes; there ought to be fifty per cent more. There are several hydrants in the vicinity of St. Luke's; would require about 400 feet of hose, which is the average lead of hose used in the city.

The loss in pressure in the hose would be about 10 pounds to each 100 feet, although the loss is different in different kinds of hose.

All fire apparatus in Denver is up-to-date, but there is a lack of quantity. With 42½ pounds static pressure at the hydrant and 400 feet of line, the pressure of the water at the nozzle should be 20 pounds; that is not adequate to fight fire with; it will throw water probably thirty feet, but the stream is not effective over ten or fifteen feet.

If there were a pressure of 75 pounds, static, at the hydrant, there would be 50 pounds at the nozzle tip, being an effective stream.

Tests were not all made within a week; they were taken whenever witness had a chance.

Does not know when water company had completed repair of June break; witness offers to repeat the tests; made notes of
487 the tests in his book as taken, but did not keep the dates, and does not know just when they were made; the driver or Mr. Mason might know. Witness feels that he did not take any tests while the water company was having trouble with the breaks in question.

The pressure at 8th and Franklin showed adequate volume of water for engine use.

Pressure at 17th and Milwaukee was adequate without an engine, but volume might not be enough with two engines. Made no actual test to determine that point. Hydrant at 14th and Marion might

be adequate, but does not know whether it would furnish 700 gallons a minute, because pressure dropped from 70 to 35 pounds.

The engineers are instructed to furnish 100 pounds pressure as a regular matter, at which rate they would take 400 gallons a minute from the hydrant. During 20 years' experience, witness has found no failure of volume, except in one instance.

Wolcott school test was made in the afternoon, but witness cannot state the date; at 13th and Clarkson, hydrant was sufficient in volume and pressure for fire-engine use; the same was true at 12th and Clarkson, and 8th and Pennsylvania and at 1st Avenue and Franklin.

The hydrant tested at Warren Ave. and University Street is colored green on the map, Exhibit A. At that point there was a static pressure of 25 pounds, a flow pressure of 20 and 15 pounds. The test at So. Washington and Iliff Street showed adequate volume and pressure for fire-engine use.

The hydrant at 6th Ave. and Cherokee, adequate in volume and pressure for fire-engine purposes; so also was hydrant at California and 19th.

Does not know other pressures at 19th and California; made some tests near depot, showing static pressure of 65 pounds, flow pressure the same.

The static pressure at depot and at 19th and California was the same; the hydrant on Boulevard F is located on the east side, on the northeast corner of 37th Avenue and on high ground.

Made tests at St. Vincent's Orphanage, on the west side of Boulevard F, at which point the pressure was greater; the hydrant on Boulevard F gave static pressure of 20 pounds, and flow pressure of 17 and 15 pounds.

The pressure at St. Vincent's Orphanage, which is on Lowell Boulevard and 42nd Avenue, was 45 pounds; the Orphanage is on much higher ground than Dean Peck's establishment. The pressure in the Italian quarter, 36th and Tejon Streets, is less than at St. Vincent's Orphanage.

488 The pressure at the hydrant on the east side of Boulevard F is probably not adequate to fight a fire in Dean Peck's establishment, but protection of that building would not be dependent on that one hydrant. If there were a 12-inch main, there would be plenty of water, even at five pounds pressure.

Hydrant at 38th and Tennyson gave adequate pressure and volume for fire-engine use. At the burning of the Elitch's Gardens building, the engine had all the water it required.

Hydrant at the Florence Crittenden home furnished adequate volume and pressure for fire-engine use; would possibly be adequate without an engine. Hydrant at 36th and Gilpin is all right for fire engine, and pretty fair for use without it.

Hydrant near Clayton College is a long distance from other developed sections. In the opinion of witness, it is inadequate to supply an engine. Clayton School has its own system.

The district in which it is situated is unsettled and the hydrant was on the end of a long single line, which was not gridironed; the

conditions were unusual; the hydrant near the Montclair school was supplied by the booster pump at 29th and Albion. The principal of the Montclair school had made complaint about the pressure, but witness' tests showed that it was all right.

The hydrant at Colorado Boulevard and Colfax showed 105 pounds static pressure and 80 and 25 pounds flow pressure.

Assuming that the main to the hydrant is a 16-inch main, witness thinks trouble must be with the hydrant.

Did not take more pressure tests in business district, because, from experience, witness knew pressure was all right.

Thought that in taking pressures at the depot would yield the highest pressure of any part in the business district; thinks pressure in business district ought to be incerased 35 pounds, but does not need it for engine use; has plenty of pressure and plenty of water with the use of engines. The test on two hydrants at 18th and Wynkoop and 17th and Wynkoop showed 65 pounds static pressure, and no reduction on flow test, indicating plenty of volume.

Have not made more than the two actual gauge tests at those points.

Says Fire Underwriters' Association is an organization of pessimists, which tries to find fault with the way cities conduct their fire departments and water systems, and are usually looking for things to find fault with in both fire department and water system.

Their reports govern the fire insurance premiums; the reports made by the National Fire Underwriters Association in 1905 and 1910 were made after an investigation conducted in Denver.

489 Witness took some of the representatives of the association around to make the tests; they tested flow, volume and pressure, opening a number of hydrants at a time. Thinks the standards of the association are just and their determinations proper, and would be glad to have a report of the association to fall back on in case of criticism of his department, or of the water situation, and witness would feel that if the Fire Underwriters' Association said that the water situation was O. K., and if he had the requisite number of fire houses and the requisite number of engines, that he would have a pretty good record to show to the public in case of criticism.

If the report of that association should endorse the fire department, the witness would think it was a good recommendation; and would have same judgment in respect to the report of that association on the water system.

Since giving direct testimony, witness has thought of a fire at 1913 Clay Street on January 12, 1913. Streams were taken from the hydrants at 21st and Clay and 21st and Decatur, and the pressure was poor; when the engine was put at work at 21st and Clay, the one working at 21st and Decatur had to be discontinued, for lack of water, and it was necessary to put on seven-eighths inch tips. When there was 150 pounds pressure on the engine, the soft suction collapsed, but at 100 pounds pressure the hydrant supplied all the water wanted. Witness thinks the volume at that hydrant was not adequate. Never became thoroughly acquainted with water

pressures, except on Capitol Hill district and parts of north side; always worked in the downtown district.

A great many years ago, when Hendrie & Bolthoff had a fire in the bottoms, the hydrant at Staunton and McNassar Streets was not sufficient to supply an extra first-size Metropolitan engine; at the zinc company fire attachment was made to a hydrant on the old South Denver plant.

At the fire on January 5, 1913, on Clay Street, near Zang's brewery, the hydrant was probably on a dead end; and at the fire at 1218 Clarkson Street, in a two-story flat-roofed house, the adapter was used, and the water just fell out of the garden hose that was attached, but the fire was put out without the aid of an engine. Witness describes other hydrants near 12th and 13th and Clarkson, which he says will not furnish water to put out fires without an engine.

There are many localities where the pressure will carry the water up without an engine. Had to use an engine at 1749 Pearl and at 1576 Pearl.

490 Have never had any trouble with an engine north of Colfax, in the dry district, but not sufficient water there to put fire out without engine; with the additional pressure specified by witness, many fires could be put out without engine; with plenty of chemical engines would have just as efficient means for fighting incipient fires.

Redirect examination by Mr. Stevens:

Witness states that he did not say that with sufficient chemical engines lack of efficiency in pressure would be supplanted; but incipient fires could be put out; any time a fire gets away from the firemen it is necessary to have a big stream.

The city would not be as well protected if the fire department had all the chemical engines which it needs and the present fire pressure was maintained, as it would be if the pressure was increased as detailed by the witness. There is a very small percentage of fires which are known as incipient fires.

If the building takes fire, water is better than chemicals. With a two and a half inch lead of hose on hydrant, and 700 gallons of water passing through it per minute, you have an adequate supply, and no matter how far the fire is, you are going to head it off.

Has never known of pressure of 115 pounds in down-town district.

Has successfully fought fire in down-town district without an engine. Every large fire has to be fought with an engine. Can fight to the third story without an engine, with 65 pounds pressure; 65 pounds is the highest pressure down town. Chemical is used to prevent damage through use of unnecessary amount of water. The nearest engine to the Montclair school is at 16th and Marion, about three miles distant. It would take fifteen or twenty minutes for the engine to reach the school. The fall of pressure

from 100 pounds to 80 pounds at the Mercy hospital indicates small mains.

All fires cannot be fought entirely with chemicals, and witness would desire 75 pounds pressure. When chemicals are used, department should be prepared with a hose line attached to adequate water supply.

Recross-examination by Mr. Dorsey:

Has made no test to ascertain whether there is a pressure of 115 pounds down town. For two years was stationed at City Hall, and pressure was usually 85 and 90 pounds.

491 Redirect examination by Mr. Stevens (resumed):

Witness produced nozzles for inspection.

The second-size fire engine pumps 700 gallons per minute; first size engine pumps 900 gallons per minute, and extra first-size pumps 1000 gallons per minute. Witness reads from Goldsmith's 1910 report, wherein the volume available at certain hydrants is set forth, and quotes from report as follows: "The discharge per hydrant in 12 groups averaged less than 600 gallons per minute, a fair supply for a second-sized fire engine, and 54 hydrants, or 33 per cent of those opened, failed to deliver that amount." (page 12, Goldsmith's 1910 report).

Cross-examination by Mr. Dorsey (continued):

Says no pressures in down-town district exceed 65 pounds. Tested two hydrants which were considered to have as high pressure as any in the down-town district; would not undertake to say that at some time other than the time of test they would not show differently. Knows that the Public Utilities Commission installed recording gauges in various fire houses in the month of June last; witness gave permission therefor.

Gauges were placed on service pipes; only saw the gauge at 18th and Blake, and never paid any attention to it. Never looked at the records; only knows what the pressure was at the points tested by witness at the time of testing.

Takes an engine about 15 or 20 minutes to get a good head of steam after arriving at fire.

Steam pressure should not be less than 100 pounds. Engines maintain about five pounds of steam in quarters. Fire is started as soon as engine goes out of door.

When engine arrives at fire it can furnish fairly efficient service, but it takes ten or fifteen minutes to get maximum service. At first they just allow the pump pressure to run through the pumps.

Witness met Mr. Goldsmith in 1910 and went around the city with him; thinks the data upon which Goldsmith's conclusions are based is correct. Since that time conditions have changed for the better in the fire department. Witness does not know about the change in the water company's system. Knows of a number of

hydrants which would not supply water to a first-size fire engine working under a full head of steam. Does not see why Goldsmith's opinion expressed in 1910 should not be correct.

Goldsmith's criticisms of fire department were probably correct when made, but have been rectified.

Department is larger, engines are in better shape and men are better trained.

492 The nozzle produced in court is the one used on engine work, and is larger than that used in residential sections.

Ordinarily, a first-size engine would not take over six or seven hundred gallons per minute, and to furnish that much from a second-size engine would require it to work to the limit.

These first or extra first-size engines working at 175 or 200 pounds pressure, deliver between six and seven hundred gallons per minute. At large fires they are worked to that extent. The second-size engine will take less.

In the districts around the packing houses and lumber yards the fires are so intense that a hard driving stream is necessary, and the engines are forced. This does not occur at the ordinary fire.

Witness was cross-examined as to the table read from page 11 of Goldsmith's 1910 report. (The testimony is not abstracted because the witness tries to tell what is in the Goldsmith report, and that report speaks for itself.)

At 33rd and Arapahoe a first or extra-first size engine would pump the hydrant dry. Witness assumes that every statement Goldsmith made is correct as of the time made.

Thinks Goldsmith would know whether system of Denver Union Water Company was efficient.

Does not know whether Goldsmith's recommendations if followed would increase the water available at the hydrants.

Redirect examination by Mr. Stevens:

Witness points out location of hydrant on South Logan and Exposition Streets.

Recross-examination by Mr. Dorsey:

Witness was called on to state what was meant by the tables in the Goldsmith report, and was not able to add anything to the statements in the report.

Witness does not know that hydrant reported by Goldsmith to have furnished 1030 gallons per minute was not the one at Exposition Street and South Logan; that hydrant being one of a group that were tested together, and the remainder being on the city's mains.

EBEN PIERCE MASON, a witness for the defendants.

Direct examination by Mr. Stevens:

Master mechanic of the fire department for fifteen years, prior to which time he was assistant engineer and engineer; assisted

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Healy in the hydrant tests of which he testified; made no
493 independent observations; took the readings and marked them down; Healy correctly stated the readings.

Cross-examination by Mr. Dorsey:

Began to take the tests the first week in June, continued for three weeks off and on, maybe two days in one week, three days in another; took them every week for three weeks, beginning the first week in June, on various days in each week; cannot give the day on which any particular tests were made.

Does not remember what tests were completed; the last test was taken before the first of July and after the 15th of June.

CHARLES J. MUNZ, a witness for the defendants.

Direct examination by Mr. Stevens:

Resides at 1192 So. Gaylord Street, corner of Arizona and South Gaylord; has lived there eight years and owns the property; four lots, eight rooms, and full basement. During all that time has taken water from the Denver Union Water Company. When he first moved in his house, had difficulty in getting water for irrigation purposes. The district was then sparsely settled. As more houses were built, the service became worse, until it became almost impossible to get water for irrigation purposes during irrigation hours, and finally no water was available at all for irrigation or domestic purposes during irrigation hours.

Describes location of his residence with reference to Exhibit A. In May, 1910, there was no water at all in his district during time the connection with a large conduit built from Marston lake was being made, except a small amount of water that would come into the pipes at night, and that water was filled with rust and sediment.

About six years ago there was a fire in the district, and the hose was attached at Arizona and So. Gaylord, and the water went about six and a half feet from the tip of the hose. Was for a long time president of the South Denver Improvement Association.

Innumerable complaints came in relative to the water pressure; water was inadequate for domestic, irrigation, toilet and bath purposes, and there was absolutely no service; this condition existed up to 1910. In May, 1910, citizens waited on Mr. Robinson, and the pipes supplying witness' district were connected up with 12-inch pipe; this gave 25 pounds pressure. The next year the water supply failed, and the committee visited Marston lake, and found
it practically dry. Witness visited Mr. Hayden, and the
494 company put up a pumping station at the corner of Jewell and South University; put in another pipe and connected it with the 12-inch pipe which was laid in 1910. From that time there has been a sufficient water supply. In the morning, when the pumps are running, the pressure is about 90 pounds, but when the consumers begin to take the water, it falls to about 45 pounds. The pressure is weaker now than it was, because more houses have

been built in the district. At the present time the pressure drops from 60 pounds at six in the morning, to about 25 pounds at 7 A. M. o'clock, when many people are irrigating. Has had no difficulty getting domestic water during irrigation hours since pumps were put in. Reduced pressure has no effect on service, except that it takes longer to irrigate than it did when pumps were first put in.

Witness has always suspected that when the water company put in the 12-inch pipe in 1910 they never opened up the valve to let the water go through it.

MICHAEL FINNERTY, a witness for the defendants.

Direct examination by Mr. Stevens:

Resides at 1417 Gaylord Street; has lived there ten or eleven years, during which time he has taken water from The Denver Union Water Company for domestic purposes; in the summer time, during lawn sprinkling, the water pressure is light; the house is a two-story house, and when water is used through the hose on the lawn, witness gets very little water on the second floor. If the neighbors are using water at the same time, gets scarcely any water at all; sometimes can't get any. In the winter time, when there is no irrigation, the pressure is sufficient. Has no difficulty getting water on the first floor while hose is working on the lawn, but it runs very slowly; might get a little water upstairs.

Cross-examination by Mr. Dorsey:

Lived in the house fourteen years; purchased the house already built; does not know when it was constructed; might have been built more than ten or twelve years when purchased by witness; built by a man named Halley; witness purchased it from a bank up at Fort Collins.

Property includes two and two-thirds lots, second house from the corner; one service pipe; house and lawn-sprinkling come from one supply pipe; never measured the service pipe which has
495 been in the ground ever since house was built; never had any necessity to make a change; has one lawn-sprinkling tap, located on the south side of the house, coming up on the inside of the house and running through the wall; uses a half or seven-eighths inch hose; thinks main to which service pipe is connected runs down Gaylord Street; does not know size of service pipe; it is galvanized iron pipe; 15 rooms in the house, one tap in the kitchen, one in the wash room on first floor, four in bath room and one in a bed room; two water closets, one on second floor and one in basement; never made complaint to water company. Witness seemed to get fully as much water as neighbors, and did not think it would be of use to complain.

Belongs to Water Consumers' League, an organization with the object of getting better pressure, more water, purer water and cheaper water.

Was a witness in the case of The New York Trust Company against the City and County of Denver, and gave testimony with regard to

the Gaylord Street house at that time; has made no effort to correct his situation since that time, except to join the Water Consumers' League.

JOSEPH P. DONLEY, a witness for the defendants.

Direct examination by Mr. Stevens:

Resides at 1920 East 14th Avenue; has resided there five or six years and used water from The Denver Union Water Company; cannot get water in bath room when using the hose; has no trouble in the winter time, but must shut off hose to get water in the bath room on second floor during irrigation season.

Has property at 31st and Julian, North Denver; there is no pressure there; has trees growing there, which he irrigates out of irrigation hours; has replaced two or three since putting them in. In irrigation hours the water runs about four or five feet away from the hose; when irrigating, cannot get any water upstairs.

This condition has existed for six or seven years; this year it has been a little better. Property looks badly. Tenants complain of the water supply.

Cross-examination by Mr. Dorsey:

Did not build the house at 1922 E. 14th St. Got it on a mortgage in 1897. It was built by T. F. Kane in 1893 or 1894. Thinks
the main supplying his house is on the south side of 14th
496 Avenue; does not know the size of his service pipe; thinks it is five-eighths inch pipe and made of lead. Kane built four houses at the same time; one big pipe comes off the main and divides in two on witness' lawn; one service pipe goes to each of two houses; knows that the pipe from the main is big enough to serve both houses; did not see it put in, and has never seen it.

Is merely stating Mr. Kane's opinion that the pipe was large enough for two houses. Only complaint is about supply during irrigation season. Has eight taps in the house, and a laundry in the basement, no barn or garage; two lawn-sprinkling taps, one at each end of the house, coming out from the brick, about a foot from the ground.

Both houses served are nine-room houses. Witness built the house at 31st and Julian about fourteen years ago. Kane made application for the service for that house. Has four lots, and subsequently built four houses there, two of which take water from the water company. The additional house built in 1907. Put in no additional service, but connected to original service pipe for first house. This service pipe is three-quarter inch lead pipe. The additional house has six rooms, with six taps and closets; original house has eight rooms with laundry and six faucets, and one water closet; three-quarter inch pipe runs from service pipe to the new house; has two irrigation taps on each house; trees are located on the parking, and tenants irrigate the lawn.

Witness steals the water for irrigating trees. When running water for irrigation, cannot get water in the bath room. When the

hose is turned off, gets water in both bath rooms; does not belong to the Water Consumers' League; testified in case of New York Trust Company against the city three years ago, and made the same complaint then that he is making now. Talked to Maloney of the water company about it, and he advised bigger service.

J. F. STEADLEY, a witness for the defendants.

Direct examination by Mr. Stevens:

Resides at 642 High Street; been there over five years, owns the premises and has used the water of The Denver Union Water Company. A few years ago complained to the company because he could not get water upstairs during irrigation hours; complained to company and was told that some conduits were about to be connected which would give better service, but service was not improved.

497 Condition still exists, in that during irrigation hours cannot flush toilet. Some years ago had to get water from the basement during irrigation hours, but have not had that trouble this past year, but has had trouble during past year getting water on second floor during irrigation hours; has complained to the water company on account of the quality of water having a stagnant taste; on one occasion was informed that they were flushing out some dead ends; another time company stated that new conduits had been put in and there was a creosote taste in the conduit; the water tasted the same no matter what was stated to be the reason therefor.

The inspector took a sample of this water, but made no report. The house has six rooms, two stories, three lots; two houses built on three lots.

Cross-examination by Mr. Dorsey:

Supervised building of own house.

Thirteen taps in the house and toilet, two sill cocks for the lawn; the main supplying the house is in High Street; does not know the size of the service pipe; pipe is galvanized iron.

(Testimony of witness as to statements of plumber stricken out.)

Water runs in the bath room during irrigation season, but not sufficient for the toilet; service has improved recently, but still has trouble with toilet during irrigation hours; is not a member of the Water Consumers' League, or Citizens Party; testified in the New York Trust Company case three years ago about the same complaint that he is now making.

JAMES N. FLOOD, a witness for the defendants.

Direct examination by Mr. Nye:

Witness is a machinist; has studied steam and electrical engineering, and for eight years has been engaged in the construction and erection of machinery for Hendrie & Bolthoff; has been particularly engaged in selling and designing mine and mill machinery and

the erection and operation thereof. Witness further qualifies by detailing his previous employment.

Has become familiar with all kinds and classes of machinery, mechanical equipment and supplies, and with cost price thereof.

In the fall of 1913, assisted the committee of engineers of the Public Utilities Commission in valuing certain property; was instructed to fix prices as to going prices of today, and did
498 so. Witness prepared the list of property to be valued by him, assisted by Mr. Angel and some employes at the works.

Visited each plant, and starting with power equipments, took all main units, description, capacity, and secured all available information; listed fittings and valves, and stock; prices applied on pumping units were obtained from manufacturer; covered all the property in the several classifications which he was handling, and made inquiry to determine whether his lists were complete.

On some small items applied depreciation; but on larger items submitted to the engineers, did not deduct depreciation, but merely advised the engineers thereof. Witness's original cost figures on Schedules F and I were carried forward by the engineers. Has not examined to see whether his exact figures were used by the engineers, but is certain that they applied approximately the depreciation to items F and I as stated by the witness.

Witness reported depreciation only on items where in his judgment special depreciation should be applied. Each item in Schedule I, stock, was listed and separately priced, and no depreciation was allowed; was assisted by Mr. Angel, and a representative of the water company was present.

(Exhibit No. 19 introduced in evidence.)

Cross-examination by Mr. Dorsey:

Witness took inventory of West Denver storehouse, assisted as stated.

Witness personally listed stuff in the yards. Stock is listed in Schedule I; witness examined Schedule I in Exhibit 19 and states that figures set down under the heading "Net Value" are the determinations made by him with respect to stock at each location mentioned.

Witness thinks total of $111,132.81, being the value of stock on hand in Exhibit 19, Schedule I, is the total reported by him, but cannot say. Assuming them to be such, they are the cost figures based on wholesale selling price f. o. b. Denver. It costs money to deliver the stock to the yards, and arrange and care for and distribute it, and to carry the stock on hand. None of these things were considered by the witness.

Witness undertakes to look at his original figures to see whether such items of costs were included in his totals.

Witness applied the prices which would be quoted by Hendrie & Bolthoff to a concern like The Denver Union Water Company, f. o. b. cars Denver, and company would have to assume costs of

transporting from cars, distributing, arranging, warehousing,
499 supervising, redistributing and carrying the stock. Witness did not consider the item of interest on the investment in the stock.

If Hendrie & Bolthoff take goods from the cars, store them in their own warehouse, and redistribute them, the cost of so doing enters into their price f. o. b. Denver; the item to be added for these costs would depend on class of material. The market price of such material fluctuates.

Witness applied price of $31 per ton to cast iron pipe, which was the price at Denver on the day of valuation, and was the price used by board of engineers on some classes of pipe.

Does not recall adding any overhead charges or interest to his unit prices, but had in mind an addition of 75 cents per ton to allow for unloading cars at the West Denver store yard.

(Further cross-examination reserved.)

Redirect examination by Mr. Nye:

Railroad tracks run into the West Denver yard. There was some second hand pipe in stock which was included in the valuation.

Recross-examination by Mr. Dorsey:

There was considerable used pipe in storage, but upon inspection it appeared to be as good as new and was so listed; it was a relatively small percentage.

Witness FLOOD resumed the stand for further

Cross-examination by Mr. Dorsey:

The figures set down by the board of engineers in Schedule I, Exhibit 19, are substantially the same as those reported by the witness to the engineers. Witness' figures included nothing on account of overhead charge, superintendence, interest on the investment, cost of unloading or cartage, or any charge of that sort. His figures were made up by assigning the cost at wholesale rates on the particular day of valuation for the articles listed, f. o. b. Denver, and no additions thereto were made for any purpose whatsoever.

Witness would add fifty to seventy cents a ton for handling the material; smaller items of stock, outside of pipe, would be handled out of cars to warehouse, handled in the warehouse, and handled out of it; cannot give the addition to f. o. b. cost price in percentages.

Does not feel qualified to express opinion on other items of overhead cost.

Redirect examination by Mr. Nye:

500 Approximately 105 tons of 16-inch pipe, or 15 per cent of the total weight of the pipe, in stock at the West side, had been used.

Recross-examination by Mr. Dorsey:

Total weight of pipe in West Denver stock was 725.62 tons, which was listed at $31 net per ton, or $22,494.22. The fifteen per cent estimate was applied to that figure, and not to the total figures on everything in the West Denver storehouse.

ARMOUR C. ANDERSON, a witness for the defendants.

Direct examination by Mr. Nye:

A member of the Public Utilities Commission of the city and county of Denver since its creation; has lived in Denver thirty-three years, and has been in the real estate business 26 or 27 years. His business included transactions in relation to real estate in the county surrounding Denver. No experience in Douglas county, but has had some transactions in Arapahoe and Jefferson counties, in acreage property; has considered various localities and character of property in the city and county of Denver.

Has had experience in condemnation matters for the city and county of Denver several times. His business has required him to become familiar with all classes of real estate in Denver and vicinity, especially lots and vacant lands, and is familiar with the value of improved and unimproved property in various sections of the city; is familiar with the lands of the water company, listed and scheduled in Exhibit C; has had occasion to specially examine them, and thinks he has been over them personally, in some cases two or three times; in conjunction with Mr. J. I. Carper, working together, witness examined several pieces of land, and where witness and Carper worked together, their valuations were joint and agreed to; work was completed September or October, 1913. There has been little change in value since that time. Does not think there has been any change for the better in the valuation of lands or lots. To arrive at a present-day valuation would make practically no change.

(Defendants' Exhibit 20 was marked for identification.)

Exhibit 20 consists of copies of pages 111 to 115, inclusive, of plaintiff's Exhibit C, covering Class A, lands and rights of way, upon which the value is set down by witness and Mr. Carper.
501 Witness is doubtful about item No. 20, Loretto Heights, which he thinks is the same as item No. 34. The total valuation as shown by Exhibit 20 is $251,207. In valuing item 9, Phebe Strong ranch, the first item of 320 acres was valued without water, the next item was valued with water, and the last item was valued without water.

Item 10, Wm. Strong ranch; item 11, Becky Archer ranch; item 12, Frank Archer ranch, were valued with water. Item 13, Mountain Reservoir Site, valued as acreage, at $5 per *per* acre. Item 16, Marston Lake flume, valued as acreage. Accepted the acreage as stated by the water company. Item 17 was valued in separate parcels, and no value was put on land included in Marston lake reservoir.

Originally, did not value land in the Cheesman reservoir site; outside of that, have valued no land covered by water. Item 18, Littleton mill property, just valued the land as acreage without water. Sullivan reservoir site, valued as dry land, without regard to its occupancy as a reservoir site. Valued item 20, Cherry Creek galleries, as acreage, of more value than dry land on hill. No value as land given to item No. 1, Ashland Avenue reservoir. Ashland Avenue pumping station valued as city lots. De Lappe Place, Cottage Hill and tank site valued as city lots.

Made no determination whether any property valued by him was used or useful in connection with water company's property. Valued land at present valuation in "our judgment." West Denver pumping plant valued as city lots, with reference to surrounding values. Witness used his general knowledge of land values entirely.

Item No. 27, Archer Lake canal and lands, valued as acreage, except where close enough to city to be valued as city lots, and then applied city-lot values; same process as to item 30, Littleton property.

Referring to tailrace, in Exhibit A-4, says it would have larger value for railroad right of way, and is well fitted for that purpose. Land in tract at West Louisiana Avenue is not in built-up section, and acreage value was applied to some of it, and some was given a lot value.

From the Mississippi gallery southward a railroad could acquire right of way over comparatively inexpensive land. Has given no attention to the value of the property for right of way purposes. Witness has given no attention to use of land shown on Exhibit A-4 for railroad right of way, although is familiar with right of way matters. If buying property in question for railroad right of way, would probably pay two or three times the valuation placed on it by witness.

502 (Over objection of plaintiff, witness was permitted to testify as to sufficiency of land on Exhibit A-4 for railroad right of way purposes.)

Says part would be sufficient in width and part would not.

Cross-examination by Mr. Dorsey:

Witness has acquired many vacant lots for himself in the city, but not any lands outside of the city, or farm lands. Has at different times dealt in farm lands or improvements outside of the city for others, in trading, selling or buying.

Has not done much in that line in the last four years; did not deal extensively in lands outside of Denver: bought some lands four or five miles northeast of town, on the river; dealt more largely 20 years ago, principally toward Sand Creek; land was at that time dry land, but now under irrigation; has dealt very little in irrigated lands; dealings have been mostly to the north and northeast of Denver; ten or twelve years ago sold some lands eleven miles south of Denver, on Broadway, a five-acre tract.

Has had other experience, but not much; nearly all of business has been in city real estate; has never dealt in Douglas county, but

some in Jefferson county and some in what is now Arapahoe county; this was 15 or 20 years ago. For the last four years has been on the Public Utilities Commission, and has not done much in buying and selling in the city, but has done a little. Generally speaking, his special knowledge is of lots within the city.

Values in Exhibit 20 represent witness' judgment. Examined each piece of property in company with Mr. Carper, except the Lake Cheesman property, which Mr. Carper did not visit.

Some of the figures on Schedules A and B, Exhibit 19, are familiar to the witness; others are not. Witness turned his figures over to the engineering committee, but witness did not arrange schedules A and B of Exhibit 19.

The valuations on sheet No. 1 of Schedule A, Exhibit 19, items 7-*a* and 7-*b*, appear to correspond with witness' valuation on Lake Cheesman land.

Witness' total value of Lake Cheesman land was $36,299, and the valuation on Schedule A, Exhibit 19, is $35,784, the difference being due to a difference in acreage.

Witness cannot state whether item 2, Exhibit 20, upon which a valuation of $765 is placed, is the intake of the new 60-inch conduit, or is the Strong reservoir site.

Witness does not know whether item 3, Exhibit 20, on which is placed a valuation of $1533, is in Jefferson or Douglas county.

503 In setting down the values on Exhibit 20, witness took them from his former report, and did not recollect exactly what they were. Item 4, Exhibit 20, consisting of 7.768 acres, refers to Platte Canon reservoir site. Witness cannot identify it on Schedule A of Exhibit 19.

Items 5 and 6, on sheet 5, Schedule A, Exhibit 19, are 85.25 and 10.30 acres, respectively; witness only valued 7.768 acres; did not value tract of 85.25 acres because that is the lake; thinks engineers' values exceeded witness' values in some instances.

Did not value item No. 5, Platte Canon filter site, and valued the land only at the Platte Canon power house site, at $700. Item No. 7, Exhibit 20, consisting of parcels No. 5-Jefferson and 6-Douglas, valued together at $1300; all of such value is on parcel 5-Jefferson; no value placed on parcel 6-Douglas.

Did not value item 8, parcel 42-Jefferson, Leehow reservoir.

Witness did not classify Phebe Strong ranch in his list in the same way that it is shown in Exhibit 19. Does not know who distributed the Phebe Strong ranch and classified it under Exhibit 19. Did not value farm improvements or other improvements on any of the land. Witness made some calculations and concludes that engineers' value of Phebe Strong land is the same as his.

Parcel 39-Jefferson, Exhibit 19, value $1600, same as witness' value; the same is true as to parcels 40 and 41, and as to the William Strong ranch, parcel 37-Jefferson, and No. 1-Douglas; nothing has been added to witness' values in Exhibit 20 to make up the engineers' values in Exhibit 19, except some value for improvements.

Witness was furnished a list according to which he made the ap-

praisement. Property was listed by number and parcel. The county numbers and parcel numbers correspond on Exhibit 19 and Exhibit 20.

Visited Cheesman three different times; has never dealt in lands in that vicinity; was offered land near Cheesman for less money than witness' valuation; mountain land, not a reservoir site; did not take into consideration Cheesman's value as a reservoir site; took largely into consideration the amount of money paid by Water Company to the government for it; understood that all land was acquired from the government at $1.25 an acre; made that examination within the last year. Think land was purchased from the government about eight years ago. The fact that the act of Congress granting the land to the water company specified $1.25 was an important
504 consideration, but that was not because the government had valued it at that figure.

Witness did not know that company already owned a great part of the land included in the Congressional Grant; did not know that the land so owned had cost approximately $150,000; understood the government grant was for lands not in the reservoir; originally did not value the land in the reservoir site, but recently valued it at $25 an acre. The board of engineers must have placed their own valuation on Cheesman reservoir in their report to Public Utilities Commission, for at that time witness would not have valued the land in Cheesman reservoir.

Valuation at $25 an acre for land within Cheesman reservoir was discussed with Mr. Fellows, and agreed upon. Witness adopted en gineers' value on Cheesman reservoir lands, and the engineers adopted values witness gave them on a number of pieces. Cheesman reservoir lands may be worth much more. Witness did not value it as a reservoir site. For such purposes, it would be worth more than $25 an acre, as a site. If reservoir is taken away, would not appraise the land at more than $25 an acre; that value is enough for a large tract, without any structure. Land in the site is better land than that surrounding it. It would probably have more value if somebody wanted it as a reservoir site. There are thousands of reservoir sites, but they have no value as such because people do not want them. In witness' judgment, it has greater value than $25 an acre as a reservoir site.

Never knew what the company paid for the land. When a filing has been made on a reservoir site, and some work done, the land has an increased value as a reservoir site.

Has had no experience in buying reservoir sites; never tried to buy one. An available site possesses higher value than ordinary mountain land. Valued the mountain land at $2.50 an acre, and agreed with the Commission on $25 an acre for the reservoir itself; was influenced by the engineers' judgment in giving higher value to land in reservoir site; does not think the land in the site would be worth $25 an acre if it was not a reservoir.

Cheesman lands are in Pike's Peak National Forest; was not aware that the lands could be surrendered and valuable script secured for them; only knowledge of such matters is what he has gained by

inspection of different places through past two or three years, being three or four reservoirs up the South Platte river between Cheesman and Antero.

Has had no definite prices on them; people have said that Commission could get such sites at their own prices; $25 an acre was the engineers' valuation, and he agrees to it; $2.50 an acre
505 for surrounding lands is witness' own judgment; has never dealt in lands in the vicinity; does not actually know whether lands are in National Forest.

Does not know what similar lands in that region have been assessed at, but the fact that such lands had been assessed at a higher value would make no difference with him; does not think the assessor's valuation has any relation to the value at all.

Did not take into consideration any cost that might be incurred in assembling the land.

All the land valued by witness at Cheesman was in patent, and he did not know that the reservoir site was also in patent, or that company acquired a great deal of it by buying mining claims. It would be necessary to buy land before beginning construction, and construction would take several years, during which land would lie idle.

Has not considered loss of interest. There is usually interest allowed for cost and interest during construction, but has allowed none in this valuation. Instead of allowing that, has doubled the value of the land. Thinks a present-day purchaser would have to pay $2.50 per acre. Has considered cost of carrying land during construction. Would allow interest on cost as the plant progressed, and then if the plant was complete, would raise the plant price.

Has allowed double for the land; does not think that interest during construction and expenses of carriage adds to the present value of the land. You are finding what the value is today, and not five or six years ago.

Would not at this time allow interest during construction on the land; would allow it when it was completed and charge it from year to year; has not taken into consideration interest during construction; thinks that he doubled the cost of the land and thereby covered cost of assembling; thinks double the cost of the land to the water company represents its fair value today.

Very little timber in the territory; was offered land between Archer and Cheesman at $2.50 per acre; has not the description of the land offered, and did not see it. Cheesman land covered with small growth of timber. Item No. 2, Exhibit 20, is the intake to 60-inch conduit; this is valued by the witness as dry land at $5 an acre. It is nothing but rocks, some timber, but less than on Cheesman land, but is nearer to Denver than Cheesman lands. Item No. 3, 306 and a fraction acres, valued at $5 an acre; better land than item 2; simply dry land; might be used for pasture, not much grass on it; land located on the right hand side of the river towards the little reservoir above the High Line canal. Was
506 shown the land, and Mr. Skouland was with him at the time. If below High Line ditch, would not be dry land; would be

worth considerably more per acre; has no special familiarity with the difference in value between irrigated and non-irrigated lands in the vicinity; valued parcel in question as dry land. If the land is below the ditch it may be worth $10 or $12 an acre.

Land capable of being irrigated is worth three times as much as land that is not capable of being irrigated. Did not value item No. 4, reservoir site. Figures opposite that item in Exhibit 20 refer to 7,768 acres, not in the reservoir site; justifies this value because part of the land is below the High Line ditch, part above, but around the lake; some could be irrigated from the lake.

Witness' attention was called to the fact that land around the reservoir at Cheesman was valued at $2.50 an acre, and land in the reservoir was valued at $25 an acre, equivalent to multiplying $2.50 by ten, but stated that that multiple was not always to be used as a measure of the difference in value between lands under water and lands around the edge of the water.

Witness thinks that if the water were let out of Cheesman lake, the land under water would be much better than that surrounding the lake.

Witness ARMOUR C. ANDERSON resumed the stand.

Item 9, Exhibit 20, Phebe Strong ranch, valued at $17,930, total acreage 688 acres; 480 acres located on right hand side of road going out are dry land, and valued at $5 an acre; part are good pasture lands and part not very good; are used for that purpose; they are better pasture lands than lands at the intake of the 60-inch conduit. Did not value any land at less than $5 an acre. Valued lands around Cheesman lake, some 7000 acres, at less than $5 an acre.

Land on top of the mountain is less in value. Does not know of any pasture land that can be bought at $5 an acre; is not familiar with the values, sales and so forth in the territory; has not known of any sales, and has had no recent experience in that territory; never has had experience as far as Platte Canon or vicinity of Phebe Strong ranch; got valuation of $5 an acre for pasture land with Mr. Carper, consulting with other people, principally from Mr. Carper. Bases judgment simply on pasture land; don't know what pasture land would cost in vicinity.

Some pasture land is not worth $5 an acre; some of it is worth more; $5 an acre is witness' judgment; would not pay that
507 much for it; was not asking what other people would pay for it; was placing his own value on the land; does not know what people would pay; had no knowledge of how little or how much others would pay; the land formed the basis of his judgment.

The land up at the intake not so good as this pasture land. Some of this 480 acres is excellent land, but is not below the ditch. Is good pasture land; not good for anything but pasture. On 200 acres assigned a value of $15,530, no improvements; included value of adequate supply of water to irrigate the lands; valued the land generally speaking at $140 an acre; some of the land would be better and some land not quite so good; cannot tell exactly how it was

divided; land in good cultivation was valued at $140 an acre, and a less valuation placed on swampy lands near the railroad tracks; that was valued at $50 an acre. Thought irrigated land with adequate water supply that near to Denver would be worth $140 an acre. It is suitable for hay or oats.

If this land had no water on it, it would run from $25 to $30 an acre; can raise some crops on it with no irrigation. The existence of an adequate water supply possibly adds $100 an acre. On looking at parcel 38, Exhibit 19, and the different classes of land, A, B, C and D, it appears that $103 is the highest valuation per acre; did not go as high as $140 an acre, on the Phebe Strong land; went as low as $10 and $15 an acre on some of the 200 acres. What he valued at $10 was dry land, but better than the dry land across the road, which was valued at $5 an acre. The total amount on Exhibit 19 is correct, but cannot say as to the classifications.

Wm. Strong ranch, parcel 37-Jefferson, and No. 1-Douglas, 280 acres valued at $21,074; classification of the land given in Exhibit 19, witness believes to be his classification, as appearing in Sheet 2, of Exhibit 19; very little of the land on Wm. Strong ranch was valued at $5 an acre; irrigated land with adequate water right valued at from $140 to $125 an acre; some not so good valued at $50 or $75 an acre; that would be land with too much water.

Parcels 37-D valued at $15 an acre; that is dry land, below the road and above the ditch. This is better land than the 160 acres in the Phebe Strong ranch that was valued at $5 an acre. This is not under ditch, but crops are being raised on it.

Item No. 11, Becky Archer ranch, 160 acres, valued at $14,120, was not classified; consists of parcels No. 36-Jefferson and No. 1-Douglas. Thinks probably the classification of parcel 36 on Exhibit 19 is witness' own classification.

508 Witness' report in writing to the engineers of the Commission substantially same as Exhibit 19. Valued dry land on Becky Archer ranch at from $10 to $30 an acre; put some dry farming land in at $10 or $15 an acre.

Thinks $125 an acre for irrigated land was the highest value on Becky Archer ranch; that value was put on 100 acres; cannot locate the land that was valued at $140 an acre, but was under the impression that some had been valued that high. There is a question whether these ranches could be called good irrigated land.

Water company's use of the water might interfere with the crops. Valued under the actual conditions; would probably have assigned considerably higher value if the water right had been better. Frank Archer ranch, item 12, valued at $37,490; there is 160 acres of dry land, at $5.00 an acre; 157.6 acres was valued at $4190, or $25 an acre, approximately; may have been all swampy land or low land, does not recollect; has not seen land in a year; 260 acres valued at $125 an acre; thinks the figures for acreages were secured from the water company; thinks Mr. Skouland told him what land had water and what land had not; the land was not classified by the water company—by Mr. Skouland.

All the acres in the Frank Archer place valued as irrigated land were 260 acres, except some that may have been valued at $25 an

acre; witness' classification indicated 260 acres was all the good irrigated land in the Frank Archer place; and on that witness put a value of $125 an acre; valuation on the Mountain reservoir, item No. 13, $5 an acre, valued as pasture land; stream of water running through it; this land might bring $5 an acre, and it might bring more; suitable for mountain ranch. Had no actual sales to guide judgment; did not value No. 14, dam and headgate of the Harriman ditch; did not value item 15, Harriman lake.

Made correction of sheet 3, Exhibit 19, value of Mountain reservoir; Marston lake flume, item 17, valued at $250; valuation about $32 an acre. Don't recall how that value is justified; valued a part only of item No. 17 at Marston lake reservoir; did not value Marston lake, but valued lands outside of the lake in different parcels; parcel 14, Jefferson, 55 acres, $1750, some at $50 and some at $10 an acre.

Has no idea what the lands cost The Denver Union Water Company when purchased; never investigated; had not the same interest in that as he had in the cost of Lake Cheesman land; whether company paid $10 or $100 an acre would make no difference in witness' valuation; the cost of Marston would be immaterial, for the land valued by witness has changed; it is now wet and soggy; conditions have also changed as to Cheesman but witness did not
509 take those into consideration. One parcel of land around Marston lake, containing 16.848 acres, valued at $500. Parcel No. 15, 28.44 acres, valued at $15 an acre; land was low land.

Probably good land before reservoir was built, and then was worth much more; land injured as result of reservoir construction, and valued in its present condition; parcel 20, 67.28 acres, $30 an acre, total $2018; this is seepage land. Does not know cost to the company; less valuable than when reservoir was built. Witness' valuation not for water works purposes; land has no particular value because of being around edge of the lake, differing from land around Platte Canon reservoir. If reservoir was fenced 100 feet from margin, the land would not have an advantage to the lake; does not know what sale price of the land would be; land is not desirable land.

Fixed values without any knowledge of market; merely going out over the land and passing on it. Item No. 18, Littleton mill, 3½ acres, valued at $2500, occupied by the mill building and grocery store; several years ago dealt in Littleton property; dealt on a lot basis; as a matter of fact, land not at the end of the main street; no lots in Littleton selling at the present time. Knows something about it, not very much; does not deal there, and has not for ten years; had a pair of lots at Littleton, and carried them for some time, and sold at a loss.

On a parcel of 10 acres at Littleton, placed value of $1000, river bottom land, not valuable for city lots; picknicking grounds next to it; the three and one-half acre tract could not well be divided into lots; valued at about $750.00 an acre.

Just looked at the land and for reasons satisfactory to witness, made up his mind that it was worth a certain value; does not believe it would sell for that.

Sullivan reservoir, item 19, 80 acres, $12.50 an acre, total value $100; part of it available for dry farming, part is not; nine or ten miles from Denver; no houses on it.

Don't know of any sales in that vicinity in recent years; judgment based on his own opinion. Item 20, Cherry Creek galleries, mostly in bed of the river along the creek, low land, 147 acres, value $4125.

Item of $1000 in ink marked "error", should not be there.

Thinks few people would buy the Sullivan reservoir for any purpose; did not value it for water works purpose.

Witness wrote "Loretto Heights, 20 acres, $1000," on original Exhibit 20; item 34, parcel 15, Exhibit 20, is valued at $500; this is witness' valuation of Loretto Heights, on a basis of 20 acres; thought it contained 40 acres when he put a valuation of $1000 on it. Thinks part of it is used for right of way; even if he is mistaken about right of way, Loretto Heights probably should be valued at $500;
510 rough, rugged land, not very desirable; located a little south of Loretto Heights, very close to the city limits. Never dealt in lands in that vicinity; most land there is under irrigation. This land is under ditch; could be irrigated if it had water.

Has no knowledge of the value of irrigated lands in that vicinity. Witness looked at the land. Does not believe there has been any sale there for quite a while; did not investigate the question. Speaking generally of his land valuations, he did sometimes investigate sales, but not very much; did not value item 21, Ashland Avenue reservoir; the engineers placed valuation on that parcel. Item 22, Ashland Avenue pumping station, valued four lots at $100 each, and seven lots at $75 each, total $925; four lots are valued as a corner and given a higher value. Recently bought four lots on the corner of Vrain and West 29th Avenue, from a quarter to half a mile east of the pumping station, bought the lands from an eastern party; lots item 22, are at Tramway transfer point; this did not influence witness.

Item 29, De Lappe Place, three and one-fifth lots, valued at $450, or $140 a lot; are in front of and across the street from lots valued at $75 a lot. De Lappe Place lots are within the city limits; the other lots are across the city boundary. The lots are curbed, which should be worth $65 a lot.

Lots inside the city are more valuable. Taxes are higher in Denver than in Jefferson county. Item 24, Cottage Hill tank site, 43 lots, $50 a lot.

Has no knowledge of recent dealings in lots there. Real estate values in Denver have had a marked slump in the last year or two. No demand for outside lots. Such condition is not permanent.

Does not know whether present condition is temporary or not. Made the value of the De Lappe lots a year ago, and thinks they are worth as much at the present time; possibly could not get as much as you could a year ago. Market conditions may remain the same for a year or so; believes they will improve; does not know of any buying or selling of lots in Cottage Hill.

Does not know of any recent sales in Cottage Hill. Lots 1 to 33, block 20, Cottage Hill, valued at $50 a lot.

Did not know that within 60 days lot 33 had sold at $175; did not know that lots 8, 9 and 10, in block 22, Cottage Hill, had within 60 days sold for $175 a lot; that fact would not affect witness' judgment, unless he knew something about the causes of the sale; if it was an ordinanry sale of real estate, witness would not be influenced by it. Does not think the lots are worth the money. Witness fixes his judgment independently of what other people say or are willing to pay: Item No. 25, appearing on Exhibit A-4, parcel No.
511 14, three lots, valued at $300 a lot, total $900. Has never dealt in lots there; does not know of other people dealing in them. There is nothing the matter with the lots; they are less than average size; had no knowledge of what lots were selling for in that locality; just looked at the lots and put a value on them; did not know that such lots had been selling at seven or eight hundred dollars a lot.

Was trying to ascertain what the lots were worth; represents witness' judgment without regard to sales made; knew nothing about sales made.

Valued 9¼ acres at $3000; has not dealt in property in that vicinity recently; does not think any property was selling around there; took his own knowledge as far as able; does not know that property in that vicinity had recently sold for from seven to eight thousand dollars an acre.

Parcel 15, one acre, valued at $3000, and 20/100ths of an acre, valued at $750; simply went out and looked at the land and put down its value, without knowing anything about sales. Item No. 26, tailrace, valued at $6210, one and nine-tenths acres being valued at $1500 an acre.

Valued a part of tailrace at $900 an acre. Knows nothing about sales there. Adjoins Baker's Villa. Some lots in Baker's Addition and Baker's Villa sell at $250 a lot, and some do not.

Tail race is lot land; it is a narrow strip of ground and down in a gulch or ditch.

Witness deducted from the value of this parcel because it is used for running ditch. Item 27, divided into a number of parcels, valued at $53,076.

Some of the parcels valued at $100, some at $150, and on up to $3000 an acre, without any consideration of rights of way. It would be worth several times that value for right of way; might cost more for a ditch right of way than for a railroad right of way; left all such matters out of consideration, and valued it simply as lots and lands; placed a higher value on lots near town; mile or two from the high-valuation territory placed lot values.

Parcel 17, 3.3 acres, valued at $1500 an acre; parcel 18, $1500 an acre; don't think any property has been selling out there; doesn't know that water company paid for one acre, constituting parcel 18, $3000; did not investigate. That price might have been paid for special reason; does not know that adjoining ground is held at $3,000 an acre.

Was told by Mr. Bartels, of Bartels and Blood, that the owners had no valuation on it. Witness could not get any valuation, so put his own on, at $1500. Parcel No. 18, 88/100ths of an acre,

valued at $1320, or $1500 an acre; about one block from the D. & R. G. shops; deducted from its value because it is a narrow
512 strip. If it had been a large tract of ground, would have placed a higher valuation on it.

Did not know that the D. & R. G. was expanding its shops in the direction of parcel 19.

Parcel 20 adjoins parcel 19, and is valued at $750 an acre, parcel 19 being given a higher value because nearer town; does not know the values of the lands held on either side.

Does not know what Middaugh holds the adjoining land for; did not inquire from Middaugh or from the Rio Grande railroad; does not remember making any inquiries from anyone. Parcel No. 22, 1.127 acres, valued at $750; does not know that the company paid Middaugh at the rate of $5000 an acre for adjoining property.

Witness deducts from value because of the shape of the piece.

Knows nothing of sales in that vicinity. Parcel 23, valued at $600, irregular shaped; low value because of the shape of the parcel; parcel 21, valued at $750, for the same reason; item 24, valued at $600 an acre, total $12,600, or about $90 a lot after taking out streets and alleys; land lies low; immediately adjoins Bailey's Addition; knows nothing about the market value of lots in Bailey's addition. Parcel is right in the lake; don't think there have been any sales in Bailey's Addition.

Don't know what the owner of Bailey's Addition is holding lots at. Parcel 24, 10.20 acres, valued at $2250, or $225 per acre. Parcel 26, 8.34 acres, valued at $2500, $300 an acre; Adjoins Richthofen's Addition; does not know of sales in Richthofen's addition at $150 a lot; any such bona fide sales would affect witness' judgment.

Twenty-lot sale would be a small purchase; such a sale, if bona fide, would indicate a value of approximately $1500 an acre. Parcel 27, 5.184 acres, about $300 an acre, total $1500.

Don't know of sales in Norwood's Addition. If somebody bought 20 lots to put building on, it might not indicate value.

Does not know the values allowed by the Alameda subway condemnation commission. Witness' judgment would not be influenced by consideration of fact that condemnation commission allowed $200 per lot.

Witness has served on condemnation commissions and allowed more than land was worth.

Parcel No. 28, 7.896 acres, valued at $1200, or less than $200 an acre. Placed lower value because of shape of the ground. Considered parcel by itself without regard to ownership of adjoining ground. Item 30, 15.847 acres, total value $2250, approximately $150 an acre. Made no inquiry to ascertain the value of adjoining ground; did not know that in 1912 a tract adjoining parcel 30 was sold at the rate of $2000 an acre.

513 Parcel No. 31 containing 20 acres valued at $6000, as acreage.

Don't know whether the parcel would be good for truck-gardening; knows of no adjacent truck gardening ground being sold for $1000 an acre. Parcel 32, 6.06 acres, valued at $900, $150 an acre.

Thinks narow strip like this parcel could not be sold for more

than $150 an acre; land is river bed gravel land; does not know that gravel pits are being operated right near it; knows nothing of the value of gravel pits.

Never heard of gravel lands being sold for $1000 an acre. Parcel No. 33, 13.31 acres, $100 an acre, $1331. This comprises the Mississippi Street galleries; simply valued it as land; did not inquire about circumstances connected with company's acquisition; does not know that the company paid $12,000 for the land; did not attempt to ascertain what it cost or was sold for years ago; did not consider its value for gravel.

Did not find how many acres in the parcel were inside the river and how many acres outside, or how much was available for gravel-bed purposes.

Parcel 34, about a quarter of an acre, valued at the rate of $300 an acre; adjoins parcel 33; would be on Louisiana Ave. if the street were opened through; being 400 feet long, would have more value than a square tract; it is 30 or 40 feet in width; controls the other land, and would be an outlet to the street if Louisiana Avenue was opened; is not sure but what the land would be 40 or 50 feet away from Louisiana Avenue. Parcel 33, opens on Mississippi Street, which is the main thoroughfare through that part of town, a bridge being across the river at that point, but added nothing to parcel 33 on that account; land runs down to Florida Street, near Overland Park; does not know what Overland Park was recently sold for.

Total value on item 27, $53,076. Item 26, $6210; item 25, $32,400, aggregate of the items $91,776.

Witness does not say that he could buy and assemble property shown on Exhibit A-4 in the same or adjacent locations for $91,776. Thinks it would cost two or three times that, or probably more. Does not think that the cost of duplicating would be any measure *or* value. Bought some lands recently for the Burlington railroad, where they paid four times its value. Item 28, four lots in University Park, $50 a lot.

Item 30, office and superintendent's residence, Littleton, $2800, does not include improvements; storage tank, Highland Park, $500; item 32, lots in Cottage Hill, 46 lots, $2025, less than $50 a lot; not so well located as other Cottage Hill lots that were valued.

514 Does not know about the recent sales in Cottage Hill.

Item 33, valued at $240; item 34, more or less a right of way, and no value placed upon it; that was valued by engineering committee.

Item 35 not valued; item 36 not valued; the 20 acres at Loretto Heights are a part of the right of way.

Did not value item 37, right of way constituting easement only; must have been valued by engineers' committee; did value some rights of way, but has no figures; remembers valuing some rights of way, but they are not included in Exhibit 20; has added nothing on account of overhead expenses. Bought land for the Burlington railroad for railroad right of way; most of it had some improvements on; the railroad had a number of agents at work; witness received compensation from those from whom the land was bought, the usual percentage. The prices paid in some instances were two or three times actual value.

Took a year or more to secure the right of way. About two years from the time first money was invested until the track was put in operation; the line was laid out before right of way was bought, and all added to the cost.

The cost of land was held inactive for a year or two; this is an element of cost. Such an element was not added in witness' valuation of water company lands.

All the water company lands valued by witness are now assembled and part of the operating property. Value of property is not affected by what it would cost to get it. Did not consider that factor in valuing water company land.

Land values are now abnormally low; did not give that fact any consideration in putting value on items 25, 26 and 27. Did not consider presence of railroad lines in vicinity; did not consider them available for trackage. Has been member of Commission since 1910.

Section 264-*a* provided that city should offer $7,000,000 for property which had been appraised in 1909 at $14,400,000, and that if the offer was rejected the city should proceed to build its own plant.

Has not made public announcement of what the property was worth. The Commission made an investigation in 1910 by Mr. Phillips and Mr. Fellows. Mr. Phillips made a report in writing, which was made public.

(Objection to offer of Mr. Phillips' report sustained.)

Witness did not make announcements to the public as to value of property. There was a bond election on the subject of issuing $8,000,000 in September, 1910; the commission got out a report
August 20, 1910, signed by witness as president of the com-
515 mission, published in printed form; anybody could get a copy; commission made a report on December 31, 1910, for year ending that date, was signed by witness, printed and put in circulation.

(Plaintiff read from that report in regard to valuation of Marston lake, which was ruled out on objection.)

(Plaintiff read from report of Commission on valuation of physical plant, which was ruled out by master.)

(Plaintiff read from report of August 20, 1910, in regard to constructing new plant, which was ruled out by master.)

Witness voted for the appointment of the engineers' committee, who made report in January, 1914, reporting values such as set forth in Exhibit 19; total value reported, excluding water rights and going-concern value, something in excess of $10,000,000; witness has refused to approve the report.

January, 1914, voted not to approve the report, because valuation was too high on some items.

Redirect examination by Mr. Nye:

Witness paid $100 a lot for four lots on 29th and Vrain; witness employed following method in valuing property: After going over the property and looking it over, he placed what, to his mind, was the present, active value of the property at the time he made the valuation.

[redacted]

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(25,566)

(25,567)

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, 1916.

No. 736.

CITY AND COUNTY OF DENVER ET AL., APPELLANTS,

vs.

THE DENVER UNION WATER COMPANY.

No. 737.

THE DENVER UNION WATER COMPANY, APPELLANT,

vs.

CITY AND COUNTY OF DENVER ET AL.

APPEALS FROM THE DISTRICT COURT OF THE UNITED STATES FOR THE DISTRICT OF COLORADO.

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GEORGE WALTER BROWN, a witness for the defendants.

Direct examination by Mr. Nye:

Lives at 2730 Vallejo Street; has lived in Denver for 42 years; contractor, does work for insurance people, estimating, settling losses; is not regularly employed; has done that work for about 40 years.

Experience has covered valuation of average buildings in Denver and throughout the state; familiar with all classes of building construction; in 1913 made an estimate of buildings, bridges and fences, and some underground work belonging to The Denver Union Water Company for the engineers' committee. Exhibit 19, Schedule H, buildings, made up figures reported by witness to the committee.

Figures represent cost to replace, from contractor's standpoint; second column shows appropriate depreciation; did not make the figures in column 3, but had corresponding figures on his report; made the figures in column 4; net value was determined by witness, and shows in column 4. Visited the different properties and made a complete investigation.

516 Commenced in August and finished in December, or January, 1913. Valuations are as of October 31, 1913.

Cross-examination by Mr. Dorsey:

Did not value farm buildings; valued filter plant and houses used in connection with it.

Valued only strictly water works improvements, except at Littleton, where valued the mill.

Total replacement value on Schedule H, $410,617.24. Did not know that Metcalfe and Anderson's figures, shown on Exhibit A-22 were $451,520. Was not aware that after allowing depreciation witness' valuation was $338,100.03 as against Metcalf and Anderson's $335,519.

WILLIAM F. ALLEN, a witness for the defendants.

Direct examination by Mr. Nye:

Resides in Denver; has been an engineer and contractor since 1894; contracts water works in particular; was employed by the Public Utilities Commission in the fall of 1913, to make values on Schedule D, infiltration galleries, Mississippi Street, Cherry Creek, mouth of Platte Canon; Schedule E, including conduits, directed particularly to the replacement value of the various conduits.

Arrived at cost value for replacement without determination for depreciation, which appears on Schedules D and E, Exhibit 19; Exhibits 21 and 22 were prepared by witness, and show replacement cost of items, Schedules D and E, as of October 31, 1913.

Made no allowance for depreciation. Was actually engaged in the construction of a number of the items valued, particularly the conduits; this gave witness general knowledge of work. Witness thinks his valuation is fair.

Would be glad to replace the property listed on Schedules D and

E, Exhibit 19, at the prices estimated in Exhibits 21 and 22, with the correction of $27,450 on Exhibit 22. Was consulted as to the life of the pipe lines.

Witness furnished the engineers of the commission with judgment as to life of pipe line.

(Exhibits 19, 20, 21 and 22 offered in evidence.)

Cross-examination by Mr. Dorsey:

Has constructed plants at Trinidad, Walsenburg, both sides of Pueblo, Colorado Springs, Leadville, Loveland, Fort Collins,
517 some of the work at Denver, irrigation plants, original gravity system of the city of Seattle, plant for Cambria Steel Company, Johnstown, Pennsylvania; Atlantic City, New Jersey; water system of Colorado Fuel and Iron Company at Pueblo; power plants at Butte, British Columbia; Trenton Chasm, New York.

Member of firm of Holme and Allen Construction Company and C. P. Allen General Contracting Company, formerly C. P. Allen and Son; now constructing Colfax-Larimer viaduct, with C. S. Lambie; C. P. Allen is not now associated, but has been for many years; he used to be connected with The Denver Union Water Company. C. P. Allen was in charge of work for water company when witness was on the work. Schedule D, Exhibit 19, relates to infiltration galleries; figures on that exhibit are not the witness' figures.

Exhibit 21 shows merely the cost of labor and material as to the infiltration galleries; total $102,921.56. Mr. C. P. Allen was engineer of the water company when Mississippi Street galleries, Platte Canon galleries, original Cherry Creek galleries were constructed. The column on the left, in Schedule D, Exhibit 19, states so-called replacement value on each one of those galleries, aggregate being $129,480.78; contractor's profit and interest during construction must be added to witness' figures; total of $129,480.78 may not include engineering and contingencies, but does include contractor's profit and interest during construction. All these elements were ignored in estimates on Exhibit 21. The figure at which witness would construct work in Schedule D, Exhibit 19, is the $129,480.78. Did not fix depreciation allowance, but gave his judgment. The committee of engineers actually inspected the work; does not know how the net value of $102,376.24 compares with Metcalfe and Anderson's net, in Exhibit A-22 of $93,286.

Used present-day quotations on materials; such quotations fluctuate. Judgment as to life of wood-stave conduits based upon witness' general experience.

Engineers for Utilities Commission sough information as to depreciation, estimated future life, and so forth, from all sources, actually inspected the property and had the pipes dug up in many places. Engineers gave conduits ten years longer line than the witness claimed for them. C. P. Allen disagreed with the witness, and some of the balance of the board disagreed with Mr. C. P. Allen. Witness knows that some of the wood-stave conduits are more than 20 or 23 years old, and are still in service; part of one conduit has been in for over thirty years.

Witness estimates thirty years as the total useful life of wood-stave conduits; would apply that estimate to some of the con-
518 duits of the water company. Thinks that some of the older conduits are today in better condition than the new ones: depends upon the construction and design. His observations apply to certain points on the line. This would not materially affect life of whole line, if the fault existing at a particular point were corrected. At present 30 years is the limit of experience with wood-stave conduits. Witness has examined the conduit constructed in 1874, and it was in good condition in 1898.

Would not say that a conduit of the water company that had been in use for thirty years would have no further useful life. There is no question of doubt as to a 30-year useful life, and might be very much longer. Comparing Conduit No. 7, Exhibit 19, Schedule E, gross replacement value of $236,153.49, with witness' figure of $191,-411.14, in Exhibit 22, witness thinks that contractor's profit and interest during construction has been added, possibly overhead charges; this is true as to all figures at the right, in Schedule E, Exhibit 19, as compared with figures on Exhibit 22. Arrives at the cost of conduit No. 7 by considering material, labor necessary for the excavation, backfilling of trench and construction of the pipe, and erection of the various parts.

Witness allows Mr. Metcalfe to use his detailed figures on both conduits 7 and 8.

WILLIAM F. ALLEN resumed the stand for further

Cross-examination by Mr. Dorsey:

Referring to Exhibit 22 and conduits Nos. 7 and 8 and No. 8 extension, listed thereon, it appears that witness' gross reproduction costs, as shown thereon, are less than the estimate of the Utilities engineers for the same item, shown on Exhibit 19; that difference shows contractor's profit and overhead. Witness' estimates on these items do not cover contractor's profit, overhead or interest during construction. The net correction of $27,450.22 appearing on the bottom of Exhibit 22 does not apply to any particular conduit; there is a small amount of it applies to conduit No. 8, but none of it applies to conduit No. 7 or No. 8 extension: $2490.75 is the correction on No. 8, covering some trestles near the mouth of the canon, earth work, loose rock, sacks, culverts, and that amount should be added to the total of $171,011.06 appearing on Exhibit 22 as the reproduction cost of conduit No. 8.

There is a credit of $35 which should be deducted, making the net addition to conduit No. 8, $2455.

519 In estimating conduit No. 8, grouped it into specials, stand-pipes, steel wells, valves, air valves, dam, intake, tunnels, sand-trap, retaining walls, concrete, excavation and trenching. This estimate does not include the plate girder bridge across the river, steel trestles carrying the conduit, boiler house, heating plant at the dam, and one truss span across the river; did not include keeper's cottages at the intake, or telephone system. Did consider the con-

crete covering between the intake and sand-trap; did not include in estimate for the work of excavation at the east portal, because the Rio Grande railroad originally started the tunnel and took out the east portal; one of the predecessor companies of the water company took possession of the old D. & R. G. right of way, on which there was a partially-constructed tunnel, and made use of that tunnel and extended it through for the pipe. There was about 30 or 40 feet of work at the east portal, and the west portal was also started. The Mountain Water Works Construction Company completed the tunnel for the use of what was known as conduit No. 2, and in the construction of conduit No. 8 the water company did not have to build the tunnel. The 66-foot tunnel was constructed in connection with conduit No. 8; the small footage of railroad work had to be enlarged.

The Citizens Water Company employed the Mountain Water Works Construction Company to build the old tunnel, and the Denver Union Water Company acquired it from The Citizens Water Company.

If the D. & R. G. had constructed the entire tunnel and presented it to the Citizens Water Company, witness would eliminate it from his estimate.

Conduits Nos. 1 and 2 were not constructed by The Denver Union Water Company; thinks No. 3 is the first one constructed by it.

The D. & R. G. built a part of the railroad grade up through the canon, and the upper end of old conduit No. 2, which was torn out to give way to conduit No. 8, was laid along the original roadbed. The original work by the railroad has never been estimated in connection with the cost of the construction of those conduits. In order to use that grade for the conduits, it was necessary to enlarge it and deepen the cuts; does not think the original railroad work should be included in the excavation cost; does not know whether the water company when it acquired the railroad grade paid anything on account of the work that had been done. The value of that work would probably be taken care of in the land values.

At the time of making estimates, did not consider the railroad work on the grade. If that railroad work were estimated, it
520 might increase the estimate on the east portal of the tunnel by $2500; that allowance would be based on the water company's estimate of quantity, and witness' unit price of $1.00 a yard. Witness' unit prices were: dry rock work, $1 a yard; for wet work, $2 a yard; loose rock, 75 cents, $1.50 for wet work; earth excavation, 50 cents for dry work and $1.00 for wet work; figured 50 cents a yard for backfilling earth work; does not use rock for backfilling; when the trench is through rock, earth has to be conveyed to it for backfilling; 50 cents per cubic yard is the allowance for putting the earth in and tamping it; has not separated the total quantities on each class of work; has not compared his quantities with those shown by Metcalf and Anderson in Exhibit C on conduit 8.

Witness repeats estimates of unit prices for different classes of excavation on conduit No. 8, to-wit: earth excavation, 50 cents per cubic yard; loose rock, 75 cents per cubic yard; solid rock, $1.00

per cubic yard, which unit prices are doubled where the respective classes must be excavated in wet condition. A small amount of excavation in connection with some cast iron pipe was not allowed on the yardage basis, but witness figured 144 feet of trench at 25 cents per lineal foot; that is exclusive of the trench estimates. On standpipe witness allowed 37 cubic yards of earth at 40 cents a yard, 90 yards of loose rock at 40 cents a yard, 40 yards of solid rock at $1.00; on the conduit proper estimated 14,770 yards of earth at 50 cents, 7950 yards of loose rock at 75 cents, 14,300 yards of rock at $1.00; the work on the trench proper was all dry work; this makes a total of 37,020 yards of dry work.

In consulting the detailed figures, finds that there was allowed 30 cents a yard for excavation; that there would be 11,800 feet of backfilling, on which there was an estimate of 25 cents per lineal foot; applied 20 cents a yard on 14,770 yards of earth excavated, which amounted to the same as 11,800 feet of backfilling at 25 cents a foot; therefore applied a price of 50 cents per yard on the total earth excavation, which covered excavation and backfilling, giving a total cost of $27,647.50 for excavation and backfilling on conduit No. 8. The length of the trench in lineal feet would be 11,800, the total length of the conduit is 12,422 feet, but there is 600 feet of wood stave pipe on steel trestle work requiring no backfilling or trenching; yardage on this trench averaged approximately 3.14 cubic yards per lineal foot, or a total of 37,020 yards. Allowed for backfilling 14,770 cubic yards. It figures the same whether figured at 25 cents per foot on 11,800 linear feet or at 20 cents per yard on 14,770 yards. Didn't know that there was actually 22,202 cubic yards of earth backfilled into No. 8 trench. Witness figured the back-
521 fill and arrived at 14,770 cubic yards. Figures a cover of two feet over the pipe. Figured the trench 7 feet on the bottom and 1¼ to 1 slope on the sides; cubical contents of the trench would be 3.14 cubic yards per lineal foot; the pipe would occupy one yard. After the pipe is placed in the trench, with two-foot cover over it, it would required a yard and a half per lineal foot to backfill the trench; calculates 1.4 yard of backfilling per lineal foot, making 16,500 yards; takes the cross-section of the trench to be 7 feet on the bottom, 7 feet deep, 1¼ to 1 slope.

Witness figures in detail the area of cross-section and yardage per lineal foot, and concludes that there would be 1.7 cubic yards per lineal foot for a level section; the slope of the hill in this case would not increase the backfill. On a basis of 1.7 cubic yards of backfill per lineal foot, the total backfill for the trench would be 20,000 yards. Witness has something like 17,000 yards in his estimate, instead of 14,770. Figured the cost of the backfill at 25 cents per lineal foot, and merely stated that that would be equal to 14,770 yards at 20 cents a yard, so that witness' estimate amounts to 14.7 cents per cubic yard for backfill and tamping; witness thinks that a fair figure, considering that 1428 feet of the pipe would be backfilled by scrapers, at 5 cents a yard. Backfilling would have to be tamped to the center of the pipe, and one-third of the material would have to be tamped by hand; this would cost 2 cents per lineal foot

of trench. The material underneath and around the pipe does not need to be replaced by hand. Conduit No. 7 extends from the end of the 60-inch conduit down to Marston Lake, comprises 52,531 feet of 48-inch wood stave pipe and 333.8 feet of 42-inch cast iron pipe, making a total length of 52,864.8 feet.

Did not include in estimate superstructure over the 48-inch hydraulic valve at the upper end, and the superstructure on the tower at Marston, or the Venturi meter; has no classification for excavation and backfilling on this conduit. Estimated 10,000 feet of trench at 47 cents per lineal foot and 42,685 feet at 43 cents per lineal foot; used a cross-section of 5½ feet on the bottom, 9 feet on top and 7 feet in depth. On 10,000 feet applied 20 cents a yard for excavation and 5 cents a yard for backfilling, and on 42,685 feet applied 18 cents for excavation and 5 cents for backfilling. On the 10,000 feet there would be some gravel work on the upper end of the line, consequently a higher price. Applied those unit prices simply on the total amount taken out. Compares the unit prices on 60-inch conduit of 30 cents for excavation and 20 cents for backfilling, with the unit prices of 25 and 23 cents, respectively, on conduit No. 7.

522 On the 60-inch conduit there were 7,000 feet of work which was hand work and 4800 feet of team work; on No. 7 the entire line was team work and worth less money. Conduit No. 7 was recently constructed by the water company, but does not know its cost in excavation and backfilling; has understood that exclusive of contractor's profit it exceeded witness' estimate. Witness' total cost for excavation and backfilling of conduit No. 7 was $23,054.55. Considered extra work necessary at ditch and creek crossings, but estimate covers that; made no separate estimate of the extra cost.

There is possibly 19,000 feet of conduit 7 in the public road; thinks allowance of 5 cents per yard for backfilling is sufficient to restore the road and clean up the line in nice shape. The tearing down and replacing of fences was considered; concrete and buttresses were separate items, yokes and tie rods were separately allowed; cleaning up the line comes under the general estimate. Has not assumed use of trenching machines; does not consider them practical for that size trench. The contractor on conduit 6 used trencher and lost money. Witness would not attempt to use trenching machines. For small narrow ditch it pays to use a trenching machine when you get below six or seven feet in depth. Has kept accounts on trenching machines as against his own work for pipe trenches where the depth was not over six or seven feet, and found it much cheaper to plow and throw out with shovels. A machine might be a benefit in case labor was short; machine would replace 300 men. Obstructions in the ground make it impossible to use trenching machines; in some parts of the streets of Denver trenching machine could be used. In 1910 could have used a trenching machine on the outskirts of the city; has never thought it would be feasible to use machine except on the outskirts of the city.

Witness made his estimate at the request of the engineers of the utilities commission at a meeting with them the last part of Novem-

ber, 1913; was being continually pressed and hurried. In latter part of November, 1913, had finished estimate on conduits 1, 2, 3 and 4; at that meeting Judge Van Cise urged witness to hurry. Witness was asked what Judge Van Cise said. (Question objected to. Discussion by counsel. Objection overruled.) Had been working on a per diem basis, and wrote a letter to the board stating that the work would be completed by January 1, 1914, but that it might be impossible to do so, and that if more time than that was required, there would be no further charge.

Judge Van Cise said to work up to within four or five days of the first of the year and guess at the balance, and witness refused to do so. Witness took his time and occupied two weeks more than was estimated.

523 Redirect examination by Mr. Nye:

Witness' work was not guess work; it was begun about the middle of September and finished about the middle of January.

In the case of conduit 7, which is constructed along the highway, it would be more convenient to get at the work, and it would be easier to work; it would not be more expensive. As to conduit No. 8, included the equalizing tank near the mouth of the tunnel; excluded the superstructures.

Witness explains the correction of his testimony as to unit cost of trenching and backfilling on conduit 8. Witness bid on the construction of conduits 7 and 8 and offered to do the work on No. 7 for about 30,000 less than the price at which it was let, so had previously estimated the construction of conduit 7, less cost of material. At that time had specifications before him; also had specifications of conduit No. 6 before him; did not bid on that conduit. Tried to sub-contract some of the work on conduit No. 8. (Witness' testimony that his bid would not be considered by the company was stricken out on objection.)

Witness' bid on conduit No. 7 was not accepted. Present estimates on various conduits include necessary work, material excavation and backfilling; profit and other additions were applied by the board of engineers. Trenching machines are variously designed with a view to use upon different classes or grades of work. Was instructed to be extremely careful and fair in his estimate.

J. I. CARPER, a witness for the defendants.

Direct examination by Mr. Nye:

Real estate business and ranching; resided in Denver a little over six years; has done more in farm lands than anything else during that time, particularly around Denver.

Some business in city lands. Assisted Armour Anderson in valuing land of Denver Union Water Company in 1913. Had a list of property and plat, went over the property, looked at it and valued it at what, in witness' judgment, it should be. Possibly some of the investigation was comparing prices of lands which had been sold

in vicinity, but opinion chiefly based upon what, in own judgment, was the real market value of each separate tract, tested by experience and what the value would be to party who desired to buy each particular tract—not what it would bring if placed on the market, particularly.

Applied all information obtainable to individual experience and judgment in arriving at value. Lands valued in October and
524 November, 1913; there has been no fluctuation since that time. Has checked in detail values set down on Exhibit 20, and are correct.

Did not assist in valuation of Lake Cheesman, but concurred in all other items on Exhibit 20. On printed page 113 of Exhibit 20 there is "Loretto Heights, 20 acres" and on page 15, item No. 34, parcel 15-Arapahoe, No. 28, contains 20 acres; there were not two parcels of 20 acres, each; has identified said parcel 15 as Loretto Heights; total valuation given on exhibit is correct. Did not value lands covered by reservoirs; valued lands surrounding reservoirs; visited the Strong and Archer ranches; valued some as lands with water and some without. Information was that water rights were good, priorities early, but that every year some water was taken for the city, and all subject to the city's needs.

(Exhibit 20, with the exception of item 1, offered as Mr. Carper's detailed testimony.)

Cross-examination by Mr. Dorsey:

Office in the First National Bank Bldg.; does business as the Denver-Colorado Securities Company, Holland Farm Company, Denver Surburban Farms Company, Altura Suburban Farms Company, has associates in these companies and is an officer therein; they deal in lands on their own account; dealings in city lands carried on through such companies; have bought some city lots and sold them and built on a few; principal business has been in outlying land.

Thinks $35,000 or $40,000 in six years would cover city real estate dealings; is not a real estate broker; has handled his own business; city property dealt in has been in Capitol Hill and Park Hill; never saw Lake Cheesman. Item 2 is mountainous and rocky, not available for agriculture, nor good grazing land; $5 an acre. Item No. 3, Exhibit 20, 306.65 acres, somewhat rolling and rocky, better than land in item 2. $5 an acre is value of item 3, and used that as minimum, so did not value item 2 at less. High Line ditch is above item 3.

Land could be irrigated, but is not; is too rough. $5 good value for grazing land in any place situated as item 3; not familiar with sale prices in that vicinity; would be glad to sell such land at $5 an acre; has dealt in grazing land east of Denver, near Greeley, and in southeastern Wyoming; land east of Denver was located about eight to ten miles from the city limits; purchased that land in 1909; have disposed of all of it; did not sell as low as $5 an acre; bought from A. D. Wall; thinks price was $5 an acre, but witness

sold it at $10 an acre; does not know whether item 3 is part
525 of the sedimentation basin; appraised seven acres and a fraction in item 4; land is dry and rolling, above the reservoir; some portion of it was good, better than item 3; valued that at between $12 and $15 an acre; land may be under the High Line ditch; thinks that is good value without water being on it.

Took into consideration the fact that the year 1913 was a year of great inactivity in real estate. It is a fact that one selling now would have to take less than normal rates, and tried to keep that in mind. Witness thinks lands would be worth more at normal times; considers that the tract is a small tract, and also the way of approach to it. Parcel 4 immediately adjoins parcel 5, where the lake is. If the lake was not there, there would be a tract of 90 acres. If the land was in one body and the lake was level, like portions of the 7 acres, and the approach was normal, would value it higher.

Irrigable land under the High Line which has no water right might be worth $12.50 to $25 an acre. Parcel 4 is small acreage tract, and took that into consideration. Did not value item 5. Part of item 6 is like item 6; this is the place where the power house and cottages are located at Platte Canon; valued that land at $30 an acre, as dry land under a ditch, without water rights. Tried to give all land fair value. Item 7 valued at $65 an acre; does not recall how that varied from item 6; did not value item 8.

Made a different classification of Phebe Strong ranch than that given under item 9. Valued 320 acres at $5 an acre, fair grazing land; thinks could buy grazing land in that locality at that price; never tried it, but can buy grazing land close to Denver, just as good, at that price, lying in immediate connection with irrigated land; cannot tell where to get such lands right near Denver, but can up at Greeley; has no knowledge on this subject with respect to grazing lands in the vicinity of Denver; knows of no sales in the immediate neighborhood of any lands exhibited on Exhibit 20. Don't recall whether endeavored to ascertain evidences of sales in the vicinity of lands valued. Phebe Strong ranch, according to witness' notes, priced 103 acres at $125, 67 acres at $15, 15 acres at $10, 15 acres at $100, classified because of difference in lands and water rights; maximum price was $125; land is excellent; would be worth more with an adequate water right.

Can get such lands with adequate water rights in normal times at $125 an acre. Bought a lot around Denver and Greeley at less prices than that. The best crop that can be raised on these lands is alfalfa; cannot pay more than that for alfalfa land; the nature of the water right limits the kind of crop, but value of $125 an acre does not represent witness' judgment as to value of land with adequate water right.

526 The water right must itself be good with reference to the date of the filing, but the water being subject to withdrawal, the land and water was figured at $125. An assured water right would add to it. The highest price allotted to dry lands was $25 an acre.

With adequate water rights the land valued at $125 an acre

should be valued at $150. An adequate water right on $25 dry land will make it worth $125 an acre. 160 acres of Phebe Strong ranch valued at $5 an acre, better land than in item 2, Exhibit 20. Applied $5 per acre on the upland pasture of the Phebe Strong ranch; the Wm. Strong ranch, valued 15 acres at $50 an acre, 25 acres at $125 an acre, 27 acres at $125 an acre, 50 acres at $15 an acre, 95 acres at $125 an acre, 25 acres at $14 an acre, 39.4 acres at $20 an acre, 3.6 acres at $10 an acre. The acreage was estimated. Skouland gave some information; Skouland went somewhat into detail. Highest value per acre was $125 on irrigated lands and this was due to the character of the water right, as in the case of the Phebe Strong ranch. Becky Archer ranch, 100 acres at $125 an acre, 17 acres at $10 an acre, 12 acres at $75 an acre; 16 acres at $25 an acre; 5.6 acres at $10 an acre; upland pasture valued at $10.

No irrigated land in the ranches was assessed higher than $125 an acre; because of the water right. Frank Archer ranch, item 12, 260 acres at $125 an acre, 67.6 acres at $25 an acre, 160 acres at $5 an acre; cannot tell where the $25 acre land was; 160 acres upland pasture at $5 an acre. Item 13, Mountain reservoir site, some like tract 2, and some like tract 3; would be called mountain pasture, not as good as some of the other, but better than the stone quarry placer claims; assigned the standard pasture land value of $5 an acre.

Item 14 not valued; did not see the headgate to the Harriman ditch and omitted that item; did not value item 15, Harriman lake; valued some land around it, about 39 acres, at $1365; does not appear on Exhibit 20.

Item 16, Marston lake flume; land is fairly good, would have been if flume was not there; flume runs through good irrigated land, and the land where the flume is located is of the same class, but valued it at $30 an acre; did not take the value of it as a right of way into consideration.

Thinks land on either side of flume without water right could be bought at $30 an acre; would not want to give a price on that land with water right, but assuming they are good irrigated lands with an adequate water supply, and level, they are worth from $125 to $150 an acre; considered the fact that the Marston flume lands were in the form of a long strip, and not suitable for agricultural purposes; would be useless for a man to buy at any price.

527 Did not give any value to the land as a right of way, but deducted value because it was a narrow strip; valued some lands in item 17, Exhibit 20; can give no further information on it.

Did value parcel 14, item 17, 55 acres, at $1750, or about $30 an acre; estimated that acreage; was endeavoring to place value on lands in Marston lake site not under water; a few other such parcels were valued, amounting to about 167 acres, valued as dry land, but good land except it has no water right. Parcel 19, 16.84 acres, valued at $30 an acre; it is good land. Does not use $30 as a standard of value for land without water, but it is the value around Marston lake.

Impression that lands valued by him are outside of embankment; parcel 15, item 17, 20 acres, at $15 an acre, $426.60; don't think it would have been termed irrigable land, but is not positive. Item 17, parcel 20, 67 acres, valued at $30 an acre.

Don't recall whether he valued seeped land, or that a low value was assigned to any Marston lake land because of seepage; does not know what the water company paid for the land, and made no inquiry; does not know about sale prices in the vicinity; did not investigate.

Did investigate irrigable land two or three miles south and east of Marston; never dealt in lands in the vicinity of Marston or the Platte Valley ranches; only knows in a general way what lands sell for in those localities; dealings in land have been generally east of Denver and east of Greeley, and some under the Castlewood ditch; had 170 acres under the Denver Suburban Homes and Water Company ditch.

Lands purchased from Mr. Wall's company were to be supplied from the High Line and Antero reservoir. They are all practically disposed of. The lands east of Greeley were close to the Platte river, under the Lower Latham ditch and reservoir.

Lands in the Pleasant Valley district near Greeley have been sold at $200 an acre, excellent lands, with adequate water supply; raise all kinds of crops because of the reliability of the water supply; could raise just as good crops on lands east of Denver if they had reliable water supply; sold lands in Pleasant Valley for more than $200 an acre when times were good.

Times now abnormal; abnormally quiet; there is no market, but there will be. Now no market for anything except what a man has to have. Littleton Mill is item No. 18, Exhibit 20; never had any experience in dealing in lands in Littleton before making value of that item; made some inquiries at Littleton, not a great deal; talked with some parties, but don't know whom; did not ask their judgment about particular lands in item 18; assigned own values; Sul-
528 livan reservoir site, item 19, Exhibit 20, valued at $1000—prairie grazing land, valued at $12.50 an acre; useful for no purpose except grazing land; too high for any kind of a ditch; thinks the value is too high, and should have been $800.

Thinks grazing land near Denver may be worth $10 an acre.

Not more than a mile difference in the distance from the city of the Wall lands and the Sullivan reservoir.

Bought 4600 acres from Wall for $276,050; varied from $5 to $100 an acre; the $5 land was about twelve miles from the city limits, considerably farther away from the Sullivan reservoir. Another quarter section was sold at $6.25 an acre, all included in the large deal.

Item 20, Cherry Creek galleries, total value $4125; assigned no value to item 21, Exhibit 20. Item 22, Ashland Avenue pumping station, divided into town lots outside of City limits; has never dealt in lands in that vicinity; have had them put up to him for sale within a year; I think they were on Vrain Street about 29th.

Valued the first four lots at $100 apiece, $75 on the other seven.

The only way that he can justify value is to say that it is his judgment on the value of it, based somewhat on what people were asking for the lots at 29th and Vrain, and they were closer in. Made some investigation, but not to any great extent. Values on this property were "our own values." On the city property, deferred a great deal to Mr. Anderson; witness' specialty has been outside property.

Anderson told witness what the lots at 29th and Vrain could be bought for; the lots were not offered to witness. Recollection is that improvement taxes were to be assumed; does not know what they amounted to; thinks possibly between $40 and $50 a lot.

Item 23, De Lappe Place pumping station, valued at almost $150 a lot; they are curbed. The fact that the lots are located at a transfer point has an effect upon the value, making them available for small business purposes; did not take that into consideration. Item 24, 43 lots, Cottage Hill, inside the city limits, on a high and sightly point, valued at $2 a front foot, five being valued at $1 a front foot.

Has never dealt in property in the vicinity of Cottage Hill; there are no sales, to speak of, to use as a criterion; did not know that recently lot 33 in block 20 had sold for $175; does not know the location of the lots by numbers.

Did not know that three lots in block 23, Cottage Hill, sold recently at $175 a lot. Knowledge of such sales would not change witness' opinion, unless he knew the details. Witness thinks market value is what a piece of property would sell for, and not what was asked for it.

529 If witness was not able to get lots at the value he thought they were worth, the market value would be more than his value, and he thinks now Cottage Hill lots can be bought for less than the market value. Would understand market price to mean what a willing buyer would pay and what a willing seller would take for a piece of property; discusses market value.

Knows the John McDonough Securities Company; they deal largely in lots in that vicinity; did not occur to witness to inquire what they were doing in buying and selling lots in that vicinity; they are general dealers; does not know if they are the principal dealers. Witness asked home owners in the vicinity of Cottage Hill what lots were selling for; relied on Mr. Anderson's judgment more than on his own as to city lots, but had many controversies on values. Based his discussions on his knowledge of values. Witness' knowledge of values in Park Hill and Capitol Hill is of some value in putting price on Cottage Hill lots. There are some good buildings down in the vicinity of Cottage Hill lots on West 33rd Avenue; did not inquire from the owners what they paid for their lots.

Referring to item 25, visited West Denver Pumping Station; concurs with Mr. Anderson's valuation of $900; never had any dealing in property in that vicinity; based value on general information; made some inquiries.

Thinks lots are in Middaugh's Addition; cannot point out the different parcels one after the other.

Inquired from different parties in the neighborhood; don't re-

member asking the names; cannot tell who they were; don't know how many persons he inquired of; knows Mr. William Allen, but did not inquire from him; did not know he owned any property there; it takes approximately ten lots to make an acre.

If witness had known that Allen put a value of $10,000 an acre on his holdings immediately adjoining West Denver pumping station, does not know whether it would have changed his judgment. Would want to see if the property had any special value. Item 25, 9-¼ acres, being parcel 9, valued at $3000 an acre, part of West Denver pumping plant; based valuation on same experience; has had some experience in track property; had some recently put up to him.

Has not been buying for two or three years; knew the land had trackage, and took it into consideration. Item 26, tail race, given an acre valuation of $1500 an acre; parcel No. 10, $1000 an acre; parcel No. 11, $750 an acre.

Thinks tailrace is south of the West Denver pumping station, but cannot tell. Tailrace is inferior land—swampy and gravel beds; it is not of any value; it comes up to and adjoins land worth $3000 an acre; does not justify the value on what land was actually
530 selling for, but on the basis of what lands are actually worth; valuations made on lands just as ordinary real estate, without specific purpose in view. Thinks values put on the tailrace according to what land would be worth in the shape it was.

Does not think it is of much value as land, but that depends on the market value of lands in the locality. Took all the steps that were necessary to judge its value; the land is surrounded by trackage; did not inquire what manufacturing establishments paid for the land they are using, or what they were holding it at. Did make general investigation of all land down there; cannot tell what specific investigation was made. It is true that Mr. Anderson largely determined figures on West Denver lands; sometimes he wanted a higher valuation than the witness, who was a "bear" on it.

Parcel 10, item 26, is down near the river; put a separate value on each parcel in item 27. Cannot locate parcel 17 of item 27. When witness was on ground, had a map with all the parcel numbers printed on it.

The value of $4545 placed on parcel 17 was the value used when the witness had the data before him; cannot state the basis of that judgment, except that some inquiry was made; it was based on their own experience; made some personal investigation, but cannot state how inquiries were made; does not know who owns the strips on either side of parcel 17; did not know Bartels Brothers owned it; phoned to Bartels and Anderson phoned him, but got no information; amount that was asked for both sides was apparently the same; witness does not recall; tried to get Bartels, and never got him; don't know whether it is Bartels, the lawyer; have forgotten which Bartels it was. They told witness nothing. Got no information from them to the effect that the land was worth $1500 an acre. Bartels is the only name witness can recall, but did inquire from quite a few. Did not ask Mr. Bartels who was in the court room; never saw him

before; supposes that some of the $1500 came from his inner consciousness. Did not know that the water company purchased parcel No. 18 within recent years, nor that they paid $3000 for it. Will agree that any reasonable price would be all right if the water company needed the land and ought to have it. If they were willing to pay $3000 an acre, it was worth that to them.

Such a piece of land would be worth anything up to a reasonable amount, according to what it was required for. Witness valued it as land. Parcel No. 19 valued at $1500. Did not know it was near D. & R. G., and did not inquire of D. & R. G. Made other inquiries, but cannot recollect from whom.

531 Parcel 20, 17 and a fraction acres, valued at $750 an acre. Only knows in a general way where it is located. It is south of a parcel that was valued at $1500 an acre. It may adjoin it; does not know; cannot tell why the difference in acreage value was arrived at. Is not very well informed right now, without the data which he had at that time in making valuation. Does not know where the map is that he used; ought to be on the ground with the map before him.

Witness has forgotten who told him about the values, but thinks he could get more data to the same effect. Cannot name a single person from whom he inquired or telephoned. Mr. Anderson did most of it. Mr. Anderson inquired by telephone, and witness only had use of that information as Anderson told him.

Parcel No. 22, value at a little less than $700 an acre; parcel No. 23, at a little more than $600 an acre; parcel No. 21, at $750 an acre; was not aware that those three parcels were purchased by the water company from Mr. Middaugh at $5000 an acre. That price for a right of way may be all right, but not as land. Thinks he could buy lots in Middaugh's and adjacent additions at $50 a lot.

Made some investigation largely through Mr. Anderson's telephone conversations, but does not know what the answers were. Parcel 24, 20 acres, valued at $12,600; does not know whether it adjoins parcel 19, which was valued at $1500. Cannot tell why there was a difference in acreage valuations between parcels 19 and 24.

Did not inquire from Phillip Ryan, who owns property adjoining; does not know where Bailey's addition is.

Does not know whether inquiries were made about lots in Bailey's Addition; does not think that lots would be sold in that addition for $250 to $300 a lot; has not a clear notion where parcel 25 is; valued it at $225 an acre, close to the river, and the river runs through it.

Does not know that the Western Chemical Company sold land adjoining it at $1000 an acre. Would not undertake to say what inquiries were made about it. Parcel 26, 8 acres, valued at $2500, approximately $300 an acre; does not know what addition it adjoins.

Does not know that lots have recently sold in Richthofen's Addition at $1500 an acre. Made no examination of the recorded deeds from the different localities; did not go to the court house; don't know whether such knowledge would have affected his judgment. Instructions were to value the land as land, and not take into con-

sideration its value as right of way or any thing else. If I
532 appraised as a right of way, value might have been increased eight or ten times. It would be important to know the sale prices for adjoining ground.

Witness took steps to ascertain the different sale transactions mentioned, but did not find them. If witness ever heard of them before, he has forgotten them. Parcel No. 27, valued at $300 an acre, total $1500, or at a rate of $30 a lot; adjoins Norwood Addition; this parcel faces Alameda Avenue.

Does not remember the condemnation suit in which similar property was taken; condemnation occurred within the last three years; parcels were valued in condemnation which were taken right out of parcel 27; valued in condemnation at $200 a lot; in condemnation a right of way value is allowed.

Values allowed by witness were without regard to condemnation value; has no idea what allowance was made in the condemnation suit. Parcel 28 adjoins parcel 27 on the west, and also faces Alameda Avenue. Assigns a value of $150 an acre to parcel 28, or $15 a lot.

Thinks he would undertake to buy lands in the neighborhood at $150 an acre; bases his judgment generally on the same considerations. Parcel 30, 16 acres, valued at $2250, or about $150 an acre; some of it approximately valueless from land and real estate standpoint, as it is part of the bank of the river; it is not valueless as river bottom, but is as land. There are good gravel beds being operated in the vicinity.

Entirely eliminates any gravel value.

Knows where the Sutton, Steele Manufacturing Company's plant is, immediately to the east of parcel 30. Did not inquire what they paid for their property, or what they held it at; didn't know that in October, 1912, they paid $2000 an acre for it; did not know that thereafter they purchased an additional strip of ground at approximately $6000 an acre; did not make sufficient inquiry to ascertain that fact; did not know that the Colorado & Southern held ground immediately adjacent to parcel 30 at 14 cents a square foot. Item 27, parcel 31, 20 acre-tract, valued at $300 an acre.

Made no inquiry as to the value of land in the vicinity; thinks that his value was assigned partly because lands in immediate vicinity were used for garden truck purposes; did not know that the garden truck lands in that vicinity could not be bought for less than $1000 an acre; made no particular inquiry with regard to this tract. Parcel 32, 6.06 acres, valued at $900, just half the price put on the adjoining parcel to the north; thinks the parcel to the north would be cheaper at $300 than parcel 32 at $150 an acre. Parcel 32 is just a long strip of land, and as land would not be worth much. The
533 fact that it is a long strip of land has something to do with its valuation, and that was taken into consideration. The same is true of parcels which constitute items 25 to 27, generally; they are less valuable because they will not readily plat into lots. The fact that they are of a shape available for the uses to which they are now put reduces their value according to the basis applied by the witness.

Parcel 32 runs through gravel beds, but the gravel value was not considered; has no familiarity with the value of gravel lands or the royalties paid. Parcel 33, 13 and a fraction acres, valued at $100 an acre; land is absolutely valueless as land; worth more as a gravel bed; it is in the midst of proven gravel ground; don't know what the prevailing price of gravel is; thinks it is 10 cents a cubic yard; thinks the land is worth $15 an acre for gravel. Parcel 34 lies just at the end of parcel 33; appraised a quarter of an acre at $75, or on the basis of $300 an acre.

Supposes there is some reason for making a difference between the acreage value on parcels 33 and 34, but cannot remember. Considering parcels 25, 26 and 27 together, gave no consideration to the fact that the land had been assembled into shape, making it available for right of way; it has value on that account, and also for the use to which it is put by the water company.

Total acreage of items 25, 26 and 27 is about 149 acres, the total value of which is $91,776; for right of way purposes it would have a much greater value—perhaps five times greater.

Does not think if someone tried to reproduce the strip of territory shown on Exhibit A-4 it could be done for $91,776; it would cost perhaps $400,000 or $500,000. Values given by witness do not include so-called overhead expenses; nothing is allowed for cost of going out and getting the property; no consideration given to interest during construction.

Items 28, 29, 30, 31 and 32 were valued on the same principle. Item 34 was not valued. Witness had nothing to do with the conduit lines, but did appraise the 20 acres at Loretto Heights.

The value of the 20 acres at Loretto Heights is reduced by presence of conduit line, which makes it less valuable as land; did not value items 35, 36 or 37; knew that the lands on Exhibit 20 had been valued by a board of appraisers appointed by the city and by the company in the year 1909. Had those values before him all the time.

Does not think the appraisement made at that time had any weight. Considers he is better informed on farm lands than city property. Some of the reservoirs, rights of way and lands
534 of that sort testified to by the witness are laid out and have been acquired for water works purposes.

The West Denver lands have greater value for purposes for which they are used than that placed on them by witness.

EDMOND C. VAN DIEST.

Direct examination:

Mining and civil engineer; graduate of Colorado State School of Mines in 1886. From 1886 to 1903, in charge of Sangre de Cristo Grant. From 1903 to 1909, engaged in development work for Gen. William J. Palmer. During that period carried out work, and designed a large portion of it, in the way of all classes of improvements—water system, steam heating system, electric plant, park construction, river improvements, and various other classes of work,

amounting to something over two and a quarter million dollars. From that time to present engaged in consulting and private interests in connection with Central Construction Company, constructing all classes of work, including reservoirs and water systems, sewer systems, pipe-line work, manufacturing of concrete products, and construction, operation and management of electric and heating plants. Personally interested in electric light and heating plants in Colorado, Wyoming and Nebraska, and have examined into their valuation in connection with purchase.

Member of the Committee of Engineers appointed by Public Utilities Commission to investigate and report upon plant of The Denver Union Water Company, of which Mr. Fellows was chairman, C. P. Allen and witness being his associates; appointed August 6, 1913, work completed January 17, 1914. Valuation made on a purchase basis.

Committee adopted plan of valuation by grouping different classes of property, enlisting services of gentlemen deemed experts for the valuation of elements—for buildings, George Walter Brown, Appraiser of Rocky Mountain Fire Underwriters' Association; equipment, J. N. Flood, of Hendrie & Bolthoff; steel work, Herbert S. Crocker, construction engineer; wood stave conduits, William F. Allen and T. J. Murphy, contracting engineers. These gentlemen in each instance instructed to list property at actual net cost of labor and material. When they made their reports, items were gone over, tabulations made up and totals drawn from different lists. To the various schedules as returned by them "we added ten per cent for engineering, and fifteen per cent for contractors' profit, overhead charges and items of that nature, contingencies, and also interest during construction at four per cent per annum for the average estimated period that the construction would require for each group."

Mr. Anderson and Mr. Carper valued the lands, listed in two schedules, one for lands outside the city, the other for lands within the city. They made valuations on these lands with the exception of lands covered by reservoirs and the filter plant. The schedules were as follows: Schedule A, lands outside of the city; Schedule B, lands inside of the city, valued, with the exceptions mentioned, by Anderson and Carper; Schedule C, structures, including reservoirs, filter basins, filtration plants, with the exception of buildings etc., valued by the Committee; Schedule D, infiltration galleries; Schedule E, conduits, valued by Allen and Murphy; Schedule F, mechanical equipment, by J. N. Flood; Schedule G, distributing system, by the Committee; Schedule H, buildings, structures and connections to buildings, by George Walter Brown; Schedule I, stock, prices, or values by Mr. Flood, assisted by Mr. Angell; Schedule K. miscellaneous, including corrections to other schedules and miscellaneous properties, by the Committee.

The several experts were employed to make up cost values on various classes, because of their special knowledge, and to save time.

Exhibit 19 is a copy of the summaries from the report made by our committee of engineers. Schedules C to I are the schedules made

up from the work of the several experts. The column "Replacement Value" contains the figures reported by the particular expert employed, plus the allowance made by the committee of engineers, costs, contractors' profit, overhead charges, interest during construction and contingencies. The column "Depreciation" shows total amount of depreciation against each item. The column "Percentage of Depreciation" shows the percentage applied and the last column shows the result after deducting depreciation.

On certain classes used the life table, on others estimates were made of serviceable life of individual elements. Life table for larger elements of property as follows: cast iron pipe, 3 and 4 inches 35 years, 6, 8 and 10 inches 50 years, 12 to 24 inches 75 years, over 24 inches 100 years; wood stave conduits 40 years; concrete lined tunnels and concrete work in reservoirs 100 years. Except as above stated, depreciation was determined for the particular article or particular class especially. For instance, where good care had been taken of the property the serviceable remaining life is more than the difference between the estimated life and the expired life. In
536 that case an estimate was made of serviceable life remaining and that was applied.

The depreciation was determined by the sinking fund method, with a view to complete amortization at the end of the useful life. Mr. Flood determined the remaining serviceable life for certain boilers and other items of equipment. Flood handled Schedule F, the major portion of Schedule I, and portions of Schedule K.

(Hre interrupted for other testimony.)

To the figures submitted by W. F. Allen, as shown on Exhibits 21 and 22, for the purpose of making up the figures in the first column under the head of "Replacement Value" in Schedules D and E in Exhibit 19, we added five per cent for engineering and fifteen per cent for contractors' profit and contingencies, and to the sum total of that figure interest during construction for the average of the estimated period required for the construction at the rate of four per cent per annum. In those schedules depreciation was deducted on the basis of an estimated life for the wood stave conduits of 40 years.

In Exhibit 19, the valuations in the various schedules were arrived at as follows: Schedule A, major portion of valuations, except areas covered by reservoirs, submitted by Armour C. Anderson, and his valuations taken by the committee, the committee valuing areas covered by reservoirs. As to Marston Lake and Platte Canon Reservoirs, the lands were valued as lands with water. As to Lake Cheesman, the lands were valued at $25 per acre. Schedule B, same as Schedule A. In Schedules A and B improvements were valued by the committee, except certain buildings valued by George Walter Brown. On lands, to the best of my recollection, the committee accepted Mr. Anderson's valuations, except certain changes made in Schedule B. Schedule C, the details determined and listed by different assistants; afterwards cost values put on them and percentages added as in the other cases. These additions were,

first, engineering, contractors' profits and contingencies, then on the total item, including those allowances, interest during construction for the average estimated period. Schedules D and E were from W. F. Allen's figures, as already detailed. Schedule F started with Mr. Flood's figures and was made up in the same way. Schedule G made up by the committee and its assistants. The property entering into this schedule was carefully listed and checked, measuring up on the official city maps and checking back from block to block along the various streets throughout the entire city. Pipe sizes taken from Water Company records; checked up at some thirty different places where examinations later made. Pipe sizes and
537 date of laying pipes confirmed in many details by C. P. Allen, who had been chief engineer and had an intimate recollection of the periods of construction.

Schedule H practically all by George Walter Brown, to whose figures the committee applied certain percentages. Schedule I by Mr. Flood. We did not consider it proper to apply any depreciation to Schedule I, as it was practically new material. Do not know whether anything was applied to schedule on account of handling, placing in stock, cost of transportation or the like. That was in the hands of the assistants, and they will have to testify in detail in regard to it.

Schedule K:—under this, "Office Equipment" includes office furniture, miscellaneous material in the offices, including the sanitary laboratory; second and third items, equipment at ranches; third item, crops, alfalfa, grain and various like items; next item, nine automobiles, valued by Mr. Flood; telephone lines, cost of construction estimated by Mountain States Company. "Miscellaneous" includes various items omitted from other schedules. The next is corrections in Schedule E, which have been carried into Exhibit 22. Schedule K may be denominated a schedule of addenda and corrections. On account of the haste constantly urged upon us, we did not have time to classify them properly.

Exhibit 23 is a summary of the various schedule summaries of Exhibit 19. Page 1 indicates valuation of property, without inclusion of going-concern value or water rights, except in so far as these items have been included with land values. Page 2 is a detailed summary of the different schedules and net valuations, with a deduction of certain property not considered by the committee essential to the operation of the system at that time, the details of which deduction appear on the last page. Page 3 is explanatory of page 2.

Exhibit 24 is a tabulation or summary of the costs of the distribution pipe system, except culverts and river crossings, used by the engineers' committee, showing what was installed in each year, the replacement value, the amount added for engineering and incidentals, contingencies and contractors' profit, and interest during construction, making the total replacement value from which depreciation was deducted. There being no definite records available, all pipe laid prior to 1890 were included under the column marked "Prior to 1890." The net value of the distribution system as shown in Exhibit 24 has been used in other exhibits.

Exhibit 25 is a tabulation prepared at the request of Mr. Nye and contains his suggestions, and also is obtained almost altogether from the different exhibits of the Water Company. Exhibit
538 26 was prepared likewise at the request of Mr. Nye, and in the same manner as Exhibit 25. In Exhibit 25, page 1, first line gives total valuation as stated in Exhibit C. Then follows list of deductions as claimed by defendants' attorneys, either as excessive or as property not essential or as property not to be included in a rate case. The first item of deduction, difference in valuation of water rights, based on difference in quantity between safe yield as claimed in Exhibit C and average daily consumption for maximum year in second feet, at $5,000 per second foot. This is explained in Exhibit 26. Page 1 of Exhibit 26 is further explained on pages 2 and 3. We took the average consumption per day for the maximum year, 1910, added water for farming purposes for 950 acres, on the theory that 1¾ acre feet per acre was needed, and on the basis of an irrigation season of 214 days, and added reservoir evaporation for 1,700 acres, covering Platte Canon, Marston and Cheesman, at the rate of 6 vertical feet per annum, making a total of 94.03 second feet, which we valued at $6,000 per second foot, producing the amount mentioned on page 1, in item 1, of Exhibit 25.

In Exhibit 25, the second item of deduction is going concern value, deducted as not properly includable in a rate-making case. The third item is explained on page 2 of Exhibit 25. Item No. 3, page 2, of Exhibit 25, is explained on page 4 of that exhibit; item No. 6 on page 5. On page 1 of Exhibit 25, item No. 4 is shown in further detail on page 6 of the same exhibit. Exhibit 25, page 1, item 5, is explained on page 7 of the exhibit. Item 6, page 1, is difference between assessed value and Exhibit C value on Lake Cheesman lands, the assessed valuation being approximately $114,120.

Item 7, page 1, Exhibit 25, is depreciation on basis of $138,000 per annum, less new construction as shown by Exhibit Z. Item 8, paving over mains as included by the Utilities Commission engineers. Exhibit 25, page 3, Schedule A-1 explained. The items covered by Schedule A-1 were eliminated in the report to the Utiliites Commission. The opinion of the committee at that time was that they were properly excluded. Exhibit 25, page 4, Schedule A-2 explained. All the items in Schedule A-2, with the exception of Lake Archer and canal, were deducted by the engineers of the Public Utilities Commission in their report, but Lake Archer and canal were not included for deduction in that report.

Exhibit 25, page 5, Schedule A-3 explained. Part of items in Schedule A-3 were deducted in the report of the Public Utilities engineers and part were not. Still of opinion that those then deducted should be deducted. One item here deducted and not deducted in the former report is Lake Archer canal and Mississippi Street con-
duit land; another is the ranches. The first is here deducted
539 on the theory that the turbine equipment is obsolete and not necessary for proper operation, because there are two other pumping units, each capable of handling estimated capacity of that station. The ranch lands are here deducted because it was not con-

sidered that they were necessary to proper maintenance of water rights.

Exhibit 25, Item 6, Valuation of Corporation Cocks, taken from Exhibit C.

For purposes of Exhibit 25, depreciation determined by taking five-twelfths of $138,000, being annual depreciation mentioned in some of plaintiff's exhibits, from this deducting new construction per Exhibit Z.

Exhibit 27 is also a tabulation prepared by witness at request of counsel. It is a tabulation showing the net return upon various assumptions as to rating base, operating expenses, and taxes, etc., on the leaflet schedule and also with a twenty per cent reduction therefrom. Witness explains the same. Page 2 shows the estimated rate of increase in net return and various percentages of depreciation, determined by the various amounts referred to in Exhibit A-19. Page 3 of Exhibit 27 is a recalculation of Exhibit A-19, Table 2, using 6% return and 1% depreciation. Method explained. Next page of Exhibit 27, being a revenue statement, explained. Figures in column headed "Interest" were shown on statements supplied by Denver Union Water Company during time of examination by witness' committee. Last page of Exhibit 27 shows profit on taps, with accretions at 4% compound interest; basic figures being from some published reports and some reports supplied by Water Company during our committee's examination.

The ten million dollar rating base used in Exhibit 27 is approximately the figure of net value of serviceable property shown on Exhibit 25.

The sixteen million dollar rating base is approximately the figure shown in Exhibit C.

The assumptions as to percentages of net return in future years stated on page 2 of Exhibit 27 are upon the theory that increases in revenue can be secured without increasing the installation beyond or in excess of amount of annual depreciation. That is to say, no increase of capital invested.

Exhibit 28 contains the detailed sheets used by our committee in connection with cost of distribution system, summarized in Exhibit 24, and are copies of the corresponding sheets in the report made to the Public Utilities Commission.

Referring to Exhibit 25, page 5, Item 27, inasmuch as we eliminated the mechanical equipment operated by the water power, think we should also have eliminated valuation we placed upon that portion of the lands. Whether Mississippi Street galleries and
540 conduit should be eliminated, express no opinion, but it would be unnecessary to retain more than land for a right of way for the conduit, "if it were possible to dispose of remaining lands at values shown here."

Have made no investigation and reached no determination as to the value of the water rights.

Assuming that all of the deductions shown on page 1 of Exhibit 25 should properly be made, net value of serviceable property for rate making purposes would, on basis of that assumption, be $10,135,379.

Except as to details of distribution system shown on Exhibit 28, I have no details on other schedules. These were left in the office last January, and apparently have been inadvertently destroyed.

Exhibits 23, 24, 25, 26, 27 and 28 offered and admitted. Exhibit 25 being admitted over objection and exception specifically made. Exhibit 26 being admitted over objection and exception specifically made. Exhibit 27 being admitted over objection and exception specifically made.

Cross-examination:

Associates on committee were A. Lincoln Fellows, a member of the Public Utilities Commission, and C. P. Allen, formerly one of the engineers of The Denver Union Water Company. This committee appointed by Public Utilities Commission, by resolution, "for the purpose of making a careful investigation of the present value to the City of Denver of The Denver Union Water Company's holdings."

Committee received no legal advice, although it sought it.

Committee valued only the physical or tangible property. All intangible values excluded, because there were certain legal points which we were not certain of, and we did not have sufficient time for investigation of the subject. We desired legal advice and could not obtain it. When we got through with physical values, we were not given a moment's more time to complete the other details, and never arrived at a conclusion as to whether the intangible values ought to be excluded or included.

Value on water rights omitted entirely, except insofar as they were included with farm lands.

Going value, or going concern value also omitted, though there was no definite determination that it should be.

Am not in a position to state the value of the water rights, assuming that they are owned by the Company. They are a very valuable asset.

My personal opinion is that in a rate case going value, or going concern value should not be included, but if, as a matter of
541 law, it should be included, it would involve a considerable addition to our valuation.

Except for an item of development expense shown on Exhibit 23, our committee confined ourselves, for the reasons stated, to the physical and tangible elements of the plant.

Exhibit 19, Schedule A, total value assigned by us to Lake Cheesman lands $36,299, by an error in addition is shown in Exhibit 19 as $35,784. Otherwise the engineers have taken into Exhibit 19 as the value of Lake Cheesman lands the values shown by Exhibit 20. Anderson fixed values outside of reservoir at two fifty per acre, and the committee accepted his valuation without investigation. The committee applied $25 per acre to the lands in the reservoir, having no regard to the fact that Anderson had fixed two fifty per acre for the lands surrounding it.

Witness has had some experience in purchase of reservoir sites, but not in that locality. Have been offered American Reservoir, but that is located in a forest reserve, and the site can not be obtained at

all except by special act of Congress. I do not know the condition of the title. What was offered me was certain bottom lands and the filings, for what they were worth. I do not know how large a portion of the area was covered by the bottom lands held in private ownership, but it was comparatively small. No work had been done on the American Reservoir, only the filings made. I am wholly unable to state whether the filings on the American Reservoir possessed any value whatever.

The original cost of Cheesman Reservoir site was not considered by us in determining the value of $25 per acre.

I have some knowledge of the Noxon site on Tarryall Creek. About three years ago I had an offer of that site. Noxon, the owner, was very hard up. Do not remember exact location of Noxon site, and have never been at it. I loaned Noxon money, which I never got back. The reservoir site was on either Lost Park or Tarryall Creek. Noxon was very much involved financially.

Also had in mind in connection with the $25 per acre valuation the Camp Creek reservoir and the Glen Eyre reservoir. The latter is a small reservoir for domestic and irrigating water supply for Glen Eyre, General Palmer's estate, for which he acquired 320 acres of land, of which 25 or 30 acres is covered by the reservoir. The price paid for that 320 acres of land is not the basis upon which the $25 per acre was determined.

Also had in mind reservoir of the Hydraulic Electric Company near Colorado Springs, up by Green Mountain Falls. The company failed to purchase from the owners of the lands, and the city bought lands within the reservoir site. I do not remember the area
542 submerged in that reservoir. It was never built.

In determining value of $25 an acre did not include cost of explorations and borings, amounting to twenty-five or thirty thousand dollars. That would be covered by our item of development expense on the whole system. All matters of that kind were intended to be covered by the general item development expense.

The reservoir sites which I have mentioned are comparable in a general way only with Lake Cheesman.

The Hydraulic Electric Company expended a great deal of money without acquiring a reservoir site at all, all of which would have to be added to the cost of the site.

In the case of Mr. Noxon, he was engaged in litigation or negotiations for years, and then did not succeed in acquiring the lands, and all the costs which he had incurred, and all the sums which he had spent would have to be taken into consideration in determining the value. However, I think that all of those things are elements of value attaching to the water rights rather than the land value. Water is the real element of value in connection with a reservoir site.

I do not remember any other reservoirs which we had in mind in fixing the value of Lake Cheesman. There are other reservoirs on the South Fork of the South Platte that I have not mentioned—the Twin Forks, or Allen and Maloney, reservoir, the Eagle, or Rhodes, reservoir, and the Bates reservoir. Made no investigation to ascertain what these reservoir sites could be obtain-d for.

The Cheesman site is an exceptional site, and possesses exceptional advantages, because of its location, lying below the mouth of Goose Creek and above all irrigable land surrounding Denver; because of the relatively small dam construction necessary; because natural stone abutments exist, and because of other like matters. On account of these "it has an exceptional value. That added value is really an item that goes to the water, as I understand it, rather than to the land itself." All values arising from such things as those mentioned above are, therefore, not included in the value of $25 per acre for the lands, because we did not value the water rights.

The $25 per acre represents the value of the lands as bottom lands only, with no addition on account of availability or desirability as a reservoir site. Water right values were omitted by us because of lack of time. We valued the land as land only. Our valuation was exclusive of water rights, and therefore we failed to include any additional value of the land on account of its adaptability for reservoir purposes.

543 The tables presented by us here in the form of exhibits cover these things only: First, values of land, as land, without regard to the added value thereof, if there be any such added value, because of the peculiar adaptability of the land as a reservoir site, or its peculiar advantages for that purpose or other like purpose; second, our estimate of reconstruction cost, less depreciation of structures; third, an estimate of something which we have called development expense, amounting to three hundred and odd thousand dollars. That is all these estimates presented by us include, and nothing more.

I think paving over mains should be included and not excluded, as we included it.

I think whatever value the water rights have should be included. Whatever the water rights are, I think they should be added to our estimate, but would not undertake to say what that value is. That value would include the added value of lands for reservoirs.

I am acquainted with the Nederland Reservoir of The Colorado Power Company, but made no investigation as to what the site cost in making the determination as to the value of Lake Cheesman lands.

Our total valuation on Lake Cheesman lands and structure was a little over $1,200,000. It is my belief that Lake Cheesman as an entity is worth more than that sum. The $25 per acre price for Lake Cheesman land was applied to 675 acres. If the submerged acreage is 874, a correction should be made.

We gave no consideration to the fact that the old board of appraisers valued the Lake Cheesman lands at $200,000. At the time of making the valuation we did not know that those lands were assessed for taxation at a value of $114,000, as shown by my exhibit 25, page 1, item 6. The lands outside the reservoir at Lake Cheesman were valued by Anderson. With the limitations stated, we adopted Anderson's valuations on the lands. I did not attempt in any way to examine any of these lands from the standpoint of land values, nor do I consider myself competent as to land values. Our acceptance of Anderson's values was based upon the assumption that he had

returned fair values on these lands, and I have no means of forming an independent judgment of my own upon that subject.

As to Platte Canon intake lands, we added nothing on account of its availability for the purpose of intake works, and did not investigate the question of its value for that purpose.

The items listed under the heading "Improvements" in the land schedules contained in Exhibit 19 are for the most part fencing and like improvements.

544 We added nothing to Anderson's values of lands used for sedimentation basins or filter beds on account of their adaptability for that purpose.

We valued the land in the Platte Canon Reservoir at $70 per acre.

Apparently, as shown by our exhibits, no valuation has been attached to parcel No. 6, Douglas, 10.30 acres.

The land in the Platte Canon Reservoir was valued as irrigated land with a rather indefinite or uncertain water right. If we had valued it as land with an adequate water right, the value per acre would have been higher.

I do not claim to be versed in real estate values. We had to assume some values for these lands, inasmuch as Anderson did not value them, but I do not claim to have any special knowledge on the subject.

Our committee valued the lands in the Platte Canon Filter site, Anderson did not. We fixed the value at about $60 per acre. I do not know why we applied a less value to that than the lands in the Platte Canon Reservoir. I do not know whether any addition should be made on account of adaptability.

Item 6, Exhibit 20, Platte Canon Power House site, Parcel No. 4, Jefferson, we adopted Anderson's figures. Do not know the basis of his valuation. It would be at the rate of about $33 per acre. I know of no reason why that land should be worth less per acre, as land, than the land in the Platte Canon Reservoir site or in the filter site. It immediately adjoins the filter site.

Item No. 7, Exhibit 20, being parcel No. 5, Jefferson, 20 acres, valued by Anderson at $1,300 and that value adopted by us. That would be at the rate of $65 per acre. I presume it adjoins the land in the Platte Canon reservoir, or the land in the filter site, or the land in the power house site, and know of no reason why it should receive a different valuation as land.

As to the gallery lands above Lehow Lake, we adopted Anderson's figures and gave no consideration to the question whether value should be added for adaptability. Would not say that such value ought not to be added.

The committee placed valuation on Lehow Lake at the rate of $30 per acre, in same general neighborhood with other lands on which higher acreage value was placed. Do not know why we assigned a lower value per acre. Think we added nothing for adaptability. The lands immediately above are Tract 5, Jefferson, Sheet 1, Schedule A, Exhibit 19, and were valued at $65 per acre.

Of the lands described up to this time, we included water right values only in respect to the lands in the Platte Canon Reservoir.

Item 14 of Exhibit 20, being parcel No. 26, Jefferson,
545 which appears in our Exhibit 19 on page 2, apparently was not valued. I think the exhibits should be corrected in that regard. Upon investigation I find that the item was inadvertently omitted. It covers the headgate of the Harriman Ditch.

We included nothing in our estimate on account of the Company's ownership in the Harriman Ditch. As stated, we omitted water right values, but something should be included in our estimate on account of the Company's interest in the ditch structure of the Harriman Ditch, which is used to convey water to Marston Lake.

We included nothing on account of the Company's ownership of an interest in Soda Lakes. Assuming that Soda Lakes is used for reservoir purposes in connection with the Water Company's plant, something should be added to our valuation on account of the structure therein, even though water right values be excluded.

We have included nothing in our valuation on account of the Company's contract with the Harriman Ditch Company for the construction and use of the enlargement of the ditch. Even though the water right values be excluded, the structural value thereof should have been included in our estimate.

Item 17, Exhibit 20, Marston Lake Reservoir, Anderson valued only a few of the several parcels of the reservoir site, the remainder being valued by our committee. Out of the total of 840.224, Anderson valued 167.51 acres, leaving 672.714 acres valued by our committee, upon which we placed a value of $119,565, or at the rate of about $170 per acre. The parcels valued by Mr. Anderson were intermingled with those valued by us, but he valued them at the rate of $28 per acre. I cannot account for the difference in rate. We valued the lands in that reservoir as farm lands with an adequate water right for irrigation purposes.

As previously stated, I have no knowledge of or experience in real estate or land values in this vicinity. I have bought or sold or otherwise dealt in lands of that sort in recent years. In the case of Lake Marston, the value assigned to the lands was strictly a value as irrigated lands, without any regard to the fact that they were in a reservoir, and without any regard to adaptability or desirability for reservoir purposes. These lands were irrigated farm lands when the Company acquired them for reservoir purposes. I do not know when the Company acquired the lands, or what they paid for them, or that they were obliged to condemn portions of them, or that they were obliged to pay in addition to the
546 ordinary or specific land value considerable additions on account of special adaptability for reservoir purposes.

All of the cost of assembling the lands in such a reservoir, the cost of acquiring the same, the interest on the investment therein, the cost of condemnation, the extra cost involved in acquiring irregular pieces, and all other like costs would be included in development expense, according to the figures presented in Exhibits

19 and 23. I recognize that all such costs must be taken care of, and the item into which we have thrown all such costs is the item "Development Expense" appearing in Exhibit 23.

As to item 20 in Exhibit 20, the Cherry Creek Galleries, our committee adopted the valuation of Mr. Anderson, adding nothin- for adaptability. The adaptability of the galleries for the purpose to which they are devoted is an element of water right value, and therefore we have not added it, because we did not include water right values.

Exhibit 19, sheet 4, tract 1, the total value should be $6,800 instead of $2,800. That item is included in our deductions, and $8,243.40 deducted on that account. There is some mistake there.

The Cottage Hill lots occupy a high point and include the Cottage Hill tank site, but we added nothing to the land values on account of special adaptability for that purpose.

Exhibit 20, items 25, 26 and 27, the West Denver lands, the committee did not accept Anderson's valuations. We thought his valuations were too low. I do not know what price or valuation we adopted as to those lands. I cannot state how we happened to hit upon these particular values, as shown by Exhibit 19, for those items. It was specifically brought to the attention of the committee that Anderson's valuations were too low; thereupon the matter was discussed and these other figures shown by Exhibit 19 placed upon the property.

If our attention had been specially directed in that regard to some of the other of Anderson's valuations, we might possibly have been inclined to make similar changes.

As to these West Denver lands, the values as adopted by us appear in Exhibit 19, Schedule B, beginning with item or parcel 9. In this Schedule B of Exhibit 19, the figures set down under the heading "Land Values" are those returned by Mr. Anderson, and under the heading "Total Values" those made by the board of engineers. No improvements are included in any of the figures in this schedule. In some instances we reduced Anderson's figures; I do not know why.

Do not know why we adopted an acreage valuation of $3,200 an acre for part of this ground. Did not know that Holme
547 and W. F. Allen, who is a son of C. P. Allen one of the members of the engineers' committee, owned the adjoining tract and held it at a valuation of $10,000 an acre. Do not know why we made other reductions in Anderson's values.

Exhibit 19, Schedule B, tract 20, do not know how we arrived at a value of $420 per acre. Think it was a clerical error in writing down the total for that item. Considering the value per acre placed by our board upon surrounding lands, it would seem to be a clerical error.

I cannot say why we increased to the extent that we did such of Anderson's valuations on the West Denver lands as we did increase.

In respect to these West Denver lands, as in respect to the other lands, we included nothing for the cost of assembling, or other like added costs.

The values at which we finally arrived for the West Denver property, covered by items 25, 26 and 27, were in our judgment the land values only, based upon the market value of adjoining lands, without the inclusion of any sort of additional cost or overhead.

Exhibit 20, items 34, 35 and 36, being rights of way for conduits; these are conduit rights of way owned in fee, valued by the committee and not by Anderson, at a total valuation of $6,520, at an average rate of approximately $50 per acre. We did not go over these conduit lands from the standpoint of real estate value. This $50 per acre was considered by us a fair average.

I have had a very limited experience in the acquisition of rights of way.

We added nothing to our values on account of added cost of acquiring narrow strips of land for right of way, or for the cost of assembling a right of way, but based the value per acre upon the per acre values of adjoining lands.

To the rights of way not owned in fee we assigned a value of $3,815. We did not go over them in detail, and do not remember the total length. 58 miles is approximately correct. Presume large portions of these rights of way are in county roads. We attached a value of the rights of way on county roads, but only the value that we thought at the time was a fair one for securing the rights. We based it upon the probable cost of securing the rights, particularly in county roads, assuming that the county commissioners would probably donate them. About all I can state relative to these rights of way is that we assigned that value, and I do not remember why. I would not be able to state now on what we based it.

548 Exhibit 19, Schdule A, Tract 7, Arapahoe, an 80 acre tract valued by Anderson at $1,000, but no value set down for it in Exhibit 19. We left it out because we did not desire to include it or the structures upon it; because we would have had to have deducted it afterwards if we had added it in, because we did not consider it used or useful.

In land values, Exhibit 19, Schedules A and B, we included nothing whatever on account of overhead expense, or on account of interest during construction.

In reproducing this water works plant, one of the first things necessary to be done is to provide the necessary land. The period of construction would be one year for plans and four or five years for actual construction, making a total of five or six years. During the period of construction the investment in lands would be making no return; that would be an overhead charge, a development expense.

Interest during construction upon the lands is analogous in principle to interest during construction on the structures. In our estimate of the reproduction cost we have included interest during construction in respect to the structures, but we have not included it at all in respect to the lands. We failed to include in the cost of reproduction interest during construction on the lands

because we were not able to determine it with the same definiteness as interest during construction on the structures. We could not make up our minds on the subject. It was one of the matters that we considered might be properly included under development expense. It was considered development expense would include that. Such development expense being the item appearing under that name in sheet 2 of Exhibit 23. That was intended to cover all those items of extra cost that we did not specify with definiteness.—overhead charges, legal expense, certain items in getting the business, and things of that sort.

As to interest during construction on lands, have understood that in the case of the Los Angeles aqueduct it represented 20% of the total cost of the lands. In the present instance the item of interest during construction would be a very large item.

Overhead expense is not included in any of our items of land values, with the possible exception of rights of way not owned in fee, which is a relatively small item. It costs money to assemble such bodies of land. This would be an actual out-of-pocket cost. Ten per cent on the prices paid would be a little high as an average for these overhead costs on lands, according to my off-hand view,
but it would approximate that. It it were eight per cent,
549 the total amount on our land valuation would be $40,000,
and our item of development expense would cover that, as well as interest during construction on the lands.

There are also carrying charges in connection with the lands before the plant begins to produce, such as taxes, which are actual out-of-pocket costs and must be taken care of somewhere in the reproduction costs. That also must be included under our item of development expense.

As to lands under the Platte Canon Reservoir, we added nothing on account of availability for reservoir purposes.

Whether we added anything for water rights to the lands under the filter beds I cannot say. I do not remember that detail.

Certain corrections in the items in Schedules A and B of Exhibit 19 noted and admitted, and corrected exhibits to be supplied.

We made no allowance for water rights values except in the following instances: As to lands in Platte Canon reservoir, valued as land having an indefinite and somewhat uncertain water right; land in Marston Lake reservoir, valued as land having an adequate water right, or one similar to the surrounding lands; possibly also as to lands under slow sand filter beds, and also certain portions of the ranch lands.

As to ranch lands, we took values as given by Anderson and Carper, with such allowance for water rights, and with an allowance for water rights of such character as Anderson and Carper have explained in their testimony.

As to interest during construction, we estimated that on all the structural parts of the plant and included it in the reconstruction cost, but we did not make such a computation or estimate in respect to the lands. As to structures, we made that computation on an average or net basis of 4% per annum, figuring that there would be a return interest on bank balances of 2%.

The subject of interest during construction was dealt with in our report to the Public Utilities Commission, which consists of two ponderous volumes, now in the court room upon counsel's table. In that regard we said in substance (exact language quoted in original transcript) that interest during construction is an actual cost which is a construction expense, and must be included in construction cost and replacement value; that four per cent bonds of the city can be sold at par; "this therefore specifies the rate." That construction, however, referred particularly to the construction of a new plant by the city. For the city's plant we did not assume any offset on account of interest on bank balances.

550 Of the total amount of expenditure, the rate of expenditure assumed was as follows: First year 5%; second year 10%; third year 20%; forth year 30%, fifth year 35%.

Report also stated that city might realize some interest from balances on hand, but no deduction was made on that account.

The report also stated on the next page that "This would be equivalent to interest on half the entire cost of labor and materials, lands etc., at four per cent for 3.4 years, or on the whole sum for 1.95 years." That quotation referred to the city's new plant. I think the word lands was inadvertently used. It was intended to apply to construction distinctly.

As to interest during construction on reproduction cost of Water Company's plant, that was computed on a basis of four per cent per annum for the average period. We used the same rate as for the city plant, because we considered that there was a return on a portion of the same of two per cent upon bank balances. We assumed that only a part of the money would be provided at first, and the balance from time to time as needed. Even then, some portion would lie in the bank and afford a return on balances. According to my assumption, money would be borrowed in installments just prior to the time of its being paid out. We assumed four per cent per annum as the net amount of interest during construction for the average period. To arrive at that we assumed some deduction from the gross rate on account of interest on bank balances. Do not recollect the details and cannot give them. I believe four per cent per annum as a net rate would be fair, and the committee so believed at the time of reporting, but I do not now recollect why.

As to interest during construction on the lands, some of the lands would have to be acquired at the beginning. According to good practice the lands, or the major part of them, are first acquired. In estimating reproduction cost of a water works plant, the assumption must be made that the constructor will acquire the lands, or the major part of them, at or near the inception of the enterprise. Consequently the capital invested therein would be idle practically through the entire period of construction, and there would be no offset on account of interest on bank balances to deduct therefrom. On the lands, the interest during construction would have to apply for a longer period than it would upon the various items of structures. The capital invested in the lands would be idle capital for a period of

five or six years. The major part of the capital going into lands would be invested for a construction period of four or five years. I do not think the rate of interest per annum would be less than six per cent. At that rate and for a period of four or five years, the interest during construction in the aggregate would amount
551 to from 24 to 30 per cent of the total amount so invested in lands.

One reason why we did not make an estimate of interest during construction on lands was because lands were valued at their present value. We also estimated materials and labor for the structures at present day values, but there we added interest during construction. Any one reproducing this plant would have to pay present day market values for the lands, as well as for the materials and labor for the structures. He would also have to stand the loss of interest during the period of construction upon present prices paid by him for the lands.

We thought interest during construction ought to be added to structures because they depreciate, but not to lands because they appreciate in value. I consider that a logical deduction.

I have already testified that I think interest during construction ought to be allowed upon the lands, and that our item of development expense was intended to cover it.

Possible increment in value of lands occurring between date of their acquisition and date when the plant begins operation ought to be offset against interest during construction on the investment in the lands.

I do not regard increment on lands as income.

According to my view, increment in land value should be included in the valuation of the property for rating purposes. Likewise, increase in value between time of acquisition and time of commencement of plant operation is an addition to capital.

If the increment in land value during the period of construction should not be offset against interest during construction on moneys invested in lands, said item of interest during construction would be a large item to be added. According to our basic valuation of lands it would amount to from 25 to 30 per cent of $500,000, roughly stated. If there had been no increase in the value of lands during the period of construction, of course there would not, upon any theory, be any deduction to make on that account.

I made no investigation to determine, and did not determine whether the lands of The Denver Union Water Company increased in value between the time of their acquisition and the end of the period of construction on each item of property.

It is impossible to say with any certainty at all that lands of this description, acquired for the reconstruction of a plant of this sort, would increase in value at all during the next five years. Whether any such increase would occur during the period of construction is entirely speculative.

552 Exhibit 19, Schedule C, cannot state allowances for overhead charges included in gross replacement value shown in column at the left. The notes are destroyed.

The three items of overhead charges which we considered were: First, engineering, considered by itself; second, contractors' profit and contingencies, considered together; third, interest during construction.

In the case of the distributing system the allowance for engineering was ten per cent, and in the case of conduits five per cent. On the other items the allowance for engineering would be greater than five and range as high as ten per cent. Fifteen per cent for contractors' profit, including contingencies, would represent approximately the average allowance.

The percentage of engineering was applied to the cost without the addition of contractors' profit and contingencies. Likewise, contractors' profit was computed on the net cost exclusive of engineering. If I had applied the percentage of engineering to the total cost, including contractors' profit, I would have reduced the percentage. This is the method in that respect which I have pursued in my practice. I do not know whether it accords with the general practice. Frequently work is done—and the largest part of the work done by my construction company is so done—upon a percentage basis, so that the owner knows the actual cost to the contractor. I do not know how general this method is.

As to taxes on the lands during construction, they would amount to a considerable sum. Assuming the period of construction to be five years and the annual taxes $4,500, they would amount to $22,500, which is an actual out-of-pocket cost which must be taken care of in the estimated cost of reconstruction; and that item is intended to be covered by our allowance of development expense.

On the structures, the allowance for contractors' profit varies in the different classes, being fifteen per cent in most cases. The lesser allowances were made in those cases where the cost of materials constituted the greater proportion of the total cost. Where the contractor makes his bid without any guaranteed profit, 15% for the contractors' profit, including use of tools and equipment and contractor's overhead cost, is the usual amount estimated.

In our estimate and in our allowance for contractors' profit and contingencies, the maximum allowance for that item being 15%, we included, in addition to the contractor's profit, the contractor's contingencies only. The company itself may suffer additional costs on account of contingencies. In this instance the company's contingencies would be covered in part by the allowance for engineering.

553 In the 15% allowed for the contractor we did not intend to cover any contingencies or overhead expenses except the contractor's own. The engineering allowance, by which, as stated, the company's contingencies might be covered, went as low as 5% on the conduits. In that case I would not consider that the contingencies were more than those of the contractor.

In the case of Lake Cheesman we did not include in the reproduction of cost of the structure the cost of the original structure which had been washed out. We concluded to allow only that portion of the preliminary investigation which would be necessary in the case of any structure of a similar nature, and that allowance was covered in our

item of development expense. That item, however, did not cover the cost of the original dam, which we concluded not to allow at all.

All of the preliminary expense, the digging of test pits, borings and the like, preliminary to the construction of Lake Cheesman, is covered by the item development expense. The cost of such work must have been large, but I cannot estimate the amount. Our board did not make a separate estimate of that item, but merely concluded that the item of development expense would cover it.

We made no allowance whatever to cover the company's contingencies except as stated above.

In the case of the conduits, the 5% allowance for engineering does not cover any contingencies, and if contingencies are covered at all in the reproduction cost in that particular schedule, they are covered by the contractor's allowance of 15%.

In Exhibit 19, Schedule C, we included nothing whatever for the paving of the Ashland Avenue reservoir. The paving was in bad condition, and we considered that it was performing no office, and therefore was of no value.

I think Exhibit 19, Schedule C, item Tanks and Stand Pipes, is in error as to net value.

Exhibit 19, Schedule C, item Capitol Hill Reservoir, I think the principal difference between our estimate and that of Metcalf and Anderson is in the excavation and embankment. Moreover, our figures do not include a number of miscellaneous items that have some relation to that reservoir, such as the roofing, the piping, the gate house, etc.

Exhibit 19, Schedule C, item West Denver Reservoir, I do not know whether anything included on account of railroad tracks and roads. The paving in that reservoir amounts approximately to 34 cents per square yard, being a total allowance of 5,234 for 12,450 square yards.

It would take some time to determine the allowance for overhead and interest during construction on Schedule C.

554 The witness is requested to refigure these schedules in Exhibit 19 relating to structures, and segregate interest during construction and overhead charges on each schedule.

Exhibit 19, Schedule D, basic figures furnished by Mr. William Allen, as shown by his Exhibit 21, and gross replacement value built up by adding thereto our percentages.

Exhibit 19, Schedule E, also built up by adopting the basic figures of Mr. Allen and adding thereto our percentages.

As to Schedule E, my recollection is that engineering was added at 5% and contractor's profit and contingencies at 15%, making 20%.

As to conduit No. 8, we added nothing to Mr. Allen's figures because of what he had omitted in respect to the East portal of the tunnel.

Mr. Allen's schedule also includes a stand pipe at $4,200, which I think is also included in Schedule C at $4,000, both figures being gross reproduction cost figures. I think this is a duplication.

Exhibit 19, Schedule F, basic figures for the most part furnished

by Mr. Flood. To some of these costs as furnished by Mr. Flood we applied certain percentages.

Exhibit 19, Schedule G, Distribution System, more fully explained in detail by Exhibits 24 and 28. One item of difference between ourselves and Metcalf and Anderson in the distribution system I suppose is the inclusion by them and exclusion by us of the corporation cocks. We estimated the reconstruction of the distribution system in its present location. Cannot give the separate details as to extra allowance on account of street railroad crossings, telephone conduits and other obstructions. Cannot give in amount the extra amount on account of street railroad crossings or on account of steam railroad crossings. River crossings are separately stated.

The corporation cocks included by Metcalf and Anderson and excluded by us are the connections with the mains only, that is, the tapping of the mains and the taps and the connections thereto by which the various service pipes are connected with the mains of the Company.

In many places Water Company mains run along under street car tracks and parallel th-reto. It is my recollection that we took that into consideration.

We included cost on account of paving over mains.

Our unit costs on pipe, delivered at the trenches, are as follows: 2 inch pipe 12 cents per foot; 2½ inch pipe 19 cents per foot; 3 and 4 inch cast iron pipe $32.75 per ton; 6 to 16 inch cast iron pipe $31.75 per ton; 18 inch cast iron pipe, or sizes above, $31.50 per ton.

555 The sheet in our Exhibit 28 showing average costs for 51 cities and cost to The Denver Union Water Company relates only to lead and jute for laying, and does not cover cost of excavation or back-filling, or cost of laying the pipe. The actual cost figures shown by Metcalf's Exhibit A-12, although they relate to work in the outskirts and less thickly settled portions of the city, are higher than the average prices assumed by us. Work in the down-town districts would cost more. Therefore the average actual cost would be greater than those figures show. We had some figures of actual cost at the time of our estimate, but just what they were I do not remember. My judgment is that the figures shown in A-12 represent higher costs than we estimated, because of piece-meal construction, wh-reas we considered it as one continuous replacement, leaving piece-meal construction out of consideration. Piece-meal construction costs more than continuous construction, largely because of the increased overhead expense. The overhead expense I understand is entirely excluded in Exhibit A-12.

In the distribution system we did not assume the use of trenching machines, but assumed hand work throughout.

As to cost of cast iron pipe, we took present day quotations. Cast iron pipe is a commodity which fluctuates considerably in price, but we did not undertake to get the average for any previous number of years. If we had any statement from The Denver Union Water Company as to actual prices paid by them for cast iron pipe, it was not given any weight in our determination.

Exhibit 19, Schedule G, Distribution System, was made up entirely by the board of engineers.

Exhibit 19, Schedule H, Mr. Brown furnished the basic figures. From those we built up the gross replacement value by the addition of certain percentages.

Exhibit 19, Schedule I, was the one estimated by Mr. Flood. The figures are exactly those furnished by Mr. Flood. We applied no percentages. I do not know what percentages ought to be added. I could not even approximate the amount.

Exhibit 19, Schedule K, is the miscellaneous schedule.

The witness' attention is called to certain errors in Exhibit 19, Schedules C, E and K. Also in schedules A and B, Exhibit 23.

Total of Schedule C as written in Exhibit 19 not correctly stated in Exhibit 23.

If the net value of Harriman Lake and Wynetka miscellaneous shown in Schedule C. Exhibit 19, be deducted from the total shown in that Exhibit, the result would be the amount carried forward into Exhibit 23.

556 Exhibit 19, Schedule G, the total does not agree with the amount carried forward and placed in Exhibit 23, Schedule G. I do not know why. There are other corrections to be made.

The item "Development Expense" appearing on page 2 of Exhibit 23, "includes all items which we were not enabled to secure definite information on, including items of preliminary expense in development, various items of overhead charges of various kinds in connection with the system as a whole. In other words, it was something to embrace practically all miscellaneous items that we were not able or did not have the time to get definite or detailed information on." That was our understanding of development expense at the time of the conclusion of our work, but not at the time when we wrote that portion of our report dealing with development expense. In that written report we said on the subject of development expense, in substance (verbatim quotation in original transcript), that a public utility corporation is entitled to a fair return. If it has not earned such fair return, the deficiency, if any, must be included in the price to be paid for the property. "This is perhaps better termed replacement of development expense, and it is to the determination of this amount of deficiency in development expense that we have confined ourselves." To determine this deficiency, value of the property at the beginning of service and at reasonable intervals during life of corporation, as well as rates of interest constituting a fair return for different periods, and average rate of depreciation, and proportion of value of non-depreciable property, such as lands, must be known. Accurate knowledge being inobtainable, the following assumptions were made: First, value in October, 1894, equal to the par value of bonds issued in payment of property, and par value of bonds issued each year thereafter represents fair value of property subsequently added; second, average of 7% per annum is fair average return for entire period; third, 1% per annum on whole value as represented by bonds, including discount on bonds,

lands, etc., would be fair average depreciation on perishable elements.

These statements we immediately followed with a tabulation. Exhibit A-64 is a copy of that table as it appears in our report. We followed this in the report with the following statement, in substance (verbatim quotation in original transcript): In this tabulation interest received on bank balances has been deducted from interest due on bonds issued. "Column 4 is the estimated fair return to which we believe the company to be entitled, based on eight per cent of the par value of the bonds issued, seven per cent of which is directly for a fair return on the investment, and one per cent for depreciation on the par value of the bonds issued.

557 We also stated in that report: "Your committee has duly considered that the interest basis adopted (seven per cent, with one per cent added for depreciation, or a total of eight per cent) represents a fair earning at the present time, but may not represent a fair earning during the earlier periods of the Water Company's operations," by which we meant that during the earlier period of the companys operations it should have been higher.

We also stated in that report, referring to said tabulation, in substance as follows (exact quotation in original transcript): that it serves to illustrate that, even under municipal ownership, "the question of rates, or the material reduction of rates must be approached with caution, in order that the citizens may not be called upon to supply deficiencies in revenue from the water system by taxation."

We also stated in that report, in substance (verbatim quotation in original transcript), that if the return has been less than the fair value of the property should have earned, the company is entitled to the amount of the deficiency; that it may be further contended that there is no provision in the franchise or permit that the earnings of the company shall be limited to a fair return. "We submit the foregoing estimate of the amount of deficiency in revenue as the fair measure of the amount of development expense due to the company at this time."

The amount entered in Exhibit 23 on page 2, opposite the item "Development Expense," is the exact amount stated in our original report quoted from as above, and shown upon the tabulation in said report, copy of which is complainant's Exhibit A-64. Nowhere else in that report do we deal with the question of development expense.

We computed development expense in the manner stated in the report because that is the only way that appeared at the time to be open to us to compute it, and I recognize that a utility corporation is entitled to have a return of this deficiency in revenue.

Personally, I think that development expense, determined in that way, should be included in the rating base. For inclusion in the rating base in a rate suit it should, in my judgment, represent the deficit in revenue, calculated as shown by complainant's Exhibit A-64, for the period during which the company has operated.

We assumed that the property in 1894 was worth the amount of the bonds issued therefor. We did not know what value, if any, attached to the stock which also was given for the property. We also

assumed that no money was invested after 1894 except money realized from additional bonds sales. If there were sums of
558 money applicable to dividends, which instead of being declared in dividends, the stockholders preferred to reinvest in the plant, that is additional capital invested. But if only the sinking fund or depreciation account is so invested, I think that there is no increase in the capital account. That applies to the one per cent allowed for depreciation. If out of moneys accruing under the earnings covered by the seven per cent allowance funds were reinvested in the plant, that is additional capital. If such additional investments were made in the case of The Denver Union Water Company, they should be added to the rating base, although that was not done in our tabulation which is Exhibit A-64.

I do not think the revenue deficits, however, should be added each year. I do not know what the practice of the Wisconsin Railroad Commission in that regard is. Personally I do not think it a proper practice.

In determining a rating base it makes no difference where the capital invested came from, whether out of the pocket of the producer of the public utility, or by the sale of stock in the corporation holding the title thereto, or by the issuance of bonds secured by a mortgage on the property; the actual capital investment remains the same. And if the Supreme Court of the United States has held that the rating base is the present fair value of the property, it makes no difference whether there are outstanding bonds or not, or whether a sinking fund has been provided or not, or whether all or any part of the bonds have been amortized or not.

Never obtained from Water Company a statement of amounts invested out of capital not obtained by the sale of bonds, nor of amounts invested in the plant from earnings.

Our tabulation, a copy of which is complainant's Exhibit A-64, was based upon the theory, which in my judgment is a correct theory, that the public utility is entitled each year to a return at a rate estimated to be fair.

We omitted the addition of yearly deficits to the rating base, and also omitted the addition of investments made otherwise than out of the proceeds of bond sales, because we considered as an offset that the fair value of the property in 1894 was probably less than the $7,000,000 in bonds issued therefor and that the surplus expended for improvements, extensions and additions were proper expenditures for maintaining the property value, in the absence of a sinking fund, and not properly an addition to capital account.

We had no definite information as to the value of the property in 1894. We understood that some of the bonds were issued for stock in underlying companies.—The Denver City Water Com-
559 pany, or The Denver City Water and Irrigation Company, The Domestic Water Company, The Beaver Brook Water Company and The Mountain Water Company. Our assumption that the seven million dollars basis with which we started was probably too large is founded upon such an understanding with respect to issuance of bonds for stock in underlying companies, and if we are

wrong in that then our other assumption is wrong. Until I have other information I still think that seven million dollars is the proper basis to start with.

At least that portion of deficit in net earnings outside of deficit in depreciation allowance should be added to capital account, but I think that would be influenced and reduced by the failure to apply the depreciation account or the increment in the depreciation account to a reduction of the bond issue and the interest charges accordingly. That is the best explanation I can give of my theory regarding my failure to add these deficits from year to year to the rating base. If the property is maintained by the depreciation account, then the remainder would be a proper addition to the capital account.

I think the interest which would accumulate upon the depreciation reserve ought to be offset against the interest upon the deficits in earnings.

Development expense and the amount thereof set down in Exhibit 23, page 2, was determined by the method and upon the principles described above. The various items, such as interest during construction on lands, overhead charges on lands, taxes during construction on lands, preliminary expense of investigation, etc., which I have stated to be covered by this item of development expense, are in my judgment reflected in the deficits in revenue by increasing the operating expenses.

My computation of deficits begins at the time when operations begin.

I do not think I am confusing the question of reconstruction cost and actual cost in allowing this item of development expense to cover actual costs involved in reproduction of the plant.

I regard development expense, determined and considered as a deficit in net earnings, to be a proper item for inclusion in the rating base.

Personally I do not regard going value, or going concern value a proper item for inclusion in such rating base. I distinguish between development expense and going value, or going concern value. I consider going value as synonymous with business worth, and development expense as an element of expense in the development of property and in bringing it to a productive basis. By going
560 concern value, I mean a value arrived at by the capitalization of net income. It would be the relation that the net income bears to the ruling rate of interest. Net income is that which results after deducting from gross income for depreciation, interest charges, operation, maintenance, taxes, insurance, and items of that sort. What I would estimate the going concern value of an enterprise would be the earning value of that enterprise, being said net earnings capitalized at whatever rate of interest I should have to pay to secure the money to invest in the enterprise. That would be limited by the length of time that the operations might continue uninterruptedly.

Therefore, according to my definition, going concern value rests primarily upon the rates which the utility collects, and that is why I think it is not properly to be included in a rate making case.

Going value, or going concern, value, according to my definition of it, is I think a proper element to be included in a determination of value for purchase, and I would so include it as an item separate and distinct from development expense. It is the business worth. The cost of building up a new plant to the situation now occupied by the present plant, would be a definite item of cost in addition to the labor and materials in constructing the plant; that is the cost of building up the business after the plant was ready to operate. I call that development expense, as distinguished from going value or going concern value.

In my judgment, whatever it costs, not only to construct the physical parts of the plant, but also build up the business, is a proper item of cost which ought to be included in the rating base. But any value which arises, either directly or indirectly, from a capitalization of income, or net income arising from an application of current rates, ought not to be so included.

I cannot approximate the amount which I would include here for going value, or going concern value, as distinguished from development expense, if this were a purchase case.

Exhibit 23, Sheet, 3, shows the depreciation applied by us to each class of property. Sheet 4 is explanatory of the deductions made on Sheet 2. The first items for deduction listed on Sheet 4 of Exhibit 23 are the Harriman Lake lands. The last items there listed are the Harriman Lake structures. In view of the difference between the total of Schedule C as it appears on Exhibit 19 and on Exhibit 23, it may be that the Harriman Lake structures are twice deducted. We expect to make up a new set of exhibits and correct these and other errors.

561 We deducted the unirrigated portions of the ranches, but retained the irrigated portions upon the assumption that they were necessary to keep the water rights unimpaired.

If the ranches are excluded, there should also be an exclusion from income and operating expense of the income and operating expense pertaining thereto.

I do not think in making a determination of value of this sort all property ought to be excluded except that which is actually at the moment in use. I would exclude all property which is not in immediate service and that which is not likely to be in service in the reasonably near future. I consider it proper for the Water Company to make reasonable provision for the future, and to include in the valuation of the property for rate purposes the value of property provided for future use, if that use is to occur within the reasonably near future.

We also excluded the pumping units at the West Denver pumping station operated by the water power, including all of the old sections with the exception of the Gaskill units. We did not look into the question of the amount of water pumped in recent years by the power pumps, or the proportion of the total amount pumped at that station which the power pumps actually pumped. We got some information, but it was of a cursory and very general nature. We did seem to realize from the amount of water pumped from that station

that the Gaskill pumps, the steam pumps, either of them was capable at rated capacity of handling all of the water which was pumped from that station. The average yield of the Mississippi Street galleries, as we had it, was 5.3 million gallons, and each of these pumps was rated at a capacity of six million gallons every twenty-four hours.

If water is frequently furnished from that source at the rate of 12 or 13 million gallons daily, the two Gaskill pumping units, if they could reach their rated capacity, would supply 12 million gallons, but that would leave no reserve pumping apparatus.

In water works practice it is considered wise to have reserve pumping units. I consider it unwise to maintain a large reserve for the pumping of water from the Mississippi Street galleries, because that water is more liable to pollution than any other water in the system. Also we considered that there was opportunity for sufficient reserve capacity through the other conduits to supply any short heavy requirement that might occur in the system. If I were the owner of the property I would not entirely eliminate those pumping units from the plant, but if I were a purchaser I
562 would not pay anything but the scrap value for them as an element of property. In this estimate I think we have not allowed even the scrap value.

One element that entered into our judgment was our theory that the Mississippi Street source of supply would sooner or later have to be given up, but our judgment was based principally on the assumption that the pumps were not at that time deemed by us necessary for the service that could be put upon that station. The water from the Mississippi Street source has up to this time remained pure.

We made no determination of the cost of furnishing water from the Mississippi Street source as compared with like water from other sources of supply owned by The Denver Union Water Company. We made no analysis to determine the cost of pumping by the water power pumps as compared with the cost of pumping by the steam pumps. The cost by the water power pumps must be less than by the steam pumps, though how much less I have not the remotest idea.

A reserve pumping capacity equal to the average capacity of the system to yield water is in my judgment all that need be maintained at any one point.

Three pumping units at the Platte Canon works were also excluded. One was included for sand pumping purposes, for cleaning the sand on the slow sand filters. I believe those pumps were installed to pump water from the slow sand filters into one of the conduits, but so far as I have been able to ascertain they have never been used for that purpose. If as a matter of fact those pumps are so connected up that in case of accident they can pump the water directly from the filters into a conduit, I should want to investigate the matter further and renew the consideration that we gave it at that time before being able to say whether or not those pumps ought

to be excluded. I think it is not only proper, but it is necessary, to provide reasonably for all contingencies.

The duplicate pipe excluded is pipe of small sizes, merely left in the ground and apparently not now performing any service.

Exhibit 24, Detail of Distribution System, is to be considered in connection with the larger Exhibit 28, which goes into further detail on the same subject.

Exhibit 25 shows certain deductions from the valuation placed upon this property by Metcalf and Anderson. In said exhibit a number of things are deducted which were not deducted from our own valuation by myself and associates on the committee of engineers. Deduction is also here made of certain items upon which we placed no value at all.

563 In our report to the Public Utilities Commission we stated in substance (exact quotation in original transcript) that we had listed and deducted those elements of property not considered necessary to the system, and also certain elements of obsolescence. We meant by that language that the things which we then deducted were the things which we considered as unnecessary to the water works system.

We also made the statement in that report, which appears on page 1 of Exhibit 23, the latter being a copy of that portion of the report, to the effect that the attached list summarized the value of that part of the property which is an essential part of the water system.

Likewise in that report the statement was made, of which page 2 Exhibit 23 is a copy, that the property summarized is considered necessary to the operation of the water system present and prospective.

Also in that report we made the statement, of which sheet 4 of Exhibit 23 is a copy, referring to the deductions then made and stating that the property so deducted is that "considered as not necessary or essential to the operation of the water system, if purchased by the city, or obsolete."

We then deducted all of the property which at that time we considered not essential. I have not since changed my mind regarding that matter, except as to the Lake Archer canal and lands, which should be excluded if the water power pumps are to be excluded. With that exception my opinion is now the same as at the time when the said report was made.

The question whether the ranch lands should be included or excluded depends upon the solution of the legal question as to whether their retention is or is not necessary for the proper maintenance of the water rights.

Exhibit 25, page 1, item 1, is based upon the assumption that some value should be included for water rights, the value there given being $565,980. At the present time I have no personal judgment as to the value of the water rights. Therefore this first item of deduction does not represent my personal judgment at all. It is a mere matter of computation, as before explained. As to that item, I merely answer for the correctness of the arithmetical computation. The detail of that computation is given in Exhibit 26.

Exhibit 26, page 1, column 1, based on figures in Exhibit C, converted from million gallons into second feet; column 2, headed "Holman," based on a letter introduced during Mr. Holman's testimony, the letter having been written in 1908, and setting forth Mr. Holman's personal determinations as of that date. Since
564 that date there have been some important changes in respect to the water rights.

Exhibit 26, page 1, column 3, "Capacities of System", more fully explained on page 2 of Exhibit 26. Exhibit 26, page 2, states the capacity of the conduits which convey the filtered water, and thereby we are limiting the capacity of the system by the capacity of the principal clear water conduits, to which we add the water for ranch purposes.

As to the 3.92 second feet for ranch purposes, that is arrived at by the method shown on last page of Exhibit 26.

Discussion of third page of Exhibit 26. Defendants' counsel withdraw from consideration column on that page headed "Water Rights as Deducted."

Exhibit 26, page 1, column 3, "Capacities of System", really represents actual average drafts on the infiltration and filtration systems, not the capacity of the conduits to convey.

Exhibit 26, page 1, column 4, "Average Daily Consumption, Maximum Year," is explained by table appearing at bottom of page 2 of Exhibit 26. The figure taken is the average daily consumption for the year 1910, although there are days in the year when the rate of consumption is very much greater than the average, and there are times in the day when the rate of consumption is greater than the maximum daily rate. At times of peak demand, which occur during irrigation hours in the summer time, water must be flowing from the system at a rate greater than the average for the day. There must be a supplemental supply capable of providing the actual daily use of water, and water rights must be provided capable of furnishing that kind of a supply.

This table is predicated upon the theory that the Water Company has no right to take a single drop of water in excess of that which it took in the year 1910, plus the use which it made of water to irrigate its ranches, and plus the evaporation from the reservoir surfaces. I would not undertake to say that as a matter of law such a theory is sound. No part of this table is a matter of my interpretation of the law. It is simply given for purposes of comparison.

The quantity taken to which the unit price of $6,000 per second foot was applied, as appears on page 1 of Exhibit 25, was the smallest quantity arrived at by any of my computations.

A flow at the rate of 94.33 cubic feet per second is the direct constant flow needed to supply the actual consumption, and furnishes nothing to fill the company's reservoirs, which have an aggregate capacity of approximately 100,000 acre feet. It is necessary
565 to have the reservoirs to furnish a supplemental or reserve supply.

The $6,000 per second foot, said to be from a statement of George G. Anderson, was from a statement made in 1908, and applicable to

the Platte Canon Ditch as it was then conditioned, and possibly to the summer flow thereof only. As to that I do not know.

The quantity of water furnished by a second foot right depends upon the length of time that the flow continues at that rate. Its value for irrigation purposes depends upon the time of the year when the water is available. So that a second foot right varies in value with respect to the ditch in which the right exists, the appropriation of the ditch, the probability of the ditch being able to get its appropriation in full or in part, and the times when it does get it. A second foot right in the English High Line would be worth very much less than a second foot right in the Platte Canon, although their intakes are quite close together.

A second foot right in the Platte Canon ditch for irrigation purposes, considered simply as a direct flow right, so that the water is usable only in the irrigation season, would produce a much less volume of water and be of less value than a second foot right in the Platte Canon Ditch with an all year round flow and a proper storage reservoir to store the flow, so that the entire volume of water so produced could be made available during the irrigation season, and in the critical period of the irrigation season, or at the time when water is most needed for irrigation purposes.

In the foregoing particulars there has been a marked change in the Platte Canon Ditch since 1908, in that by conduit No. 7 a connection with Marston Lake has been made and storage thus provided.

I do not mean to say that in my judgment $6,000 per second foot is the value of these water rights. I do not answer for the correctness of that assertion. Nor do I state it as my judgment that 94.33 second feet is the total quantity of water owned by The Denver Union Water Company, and which ought to be included in the rating base. That also is a mere assumption.

It is proper in my judgment to include in the rating base additional property provided for growth within the reasonably near future, and there should be an added element of quantity on that account in respect to the water. That is not included in Exhibits 25 and 26.

94.33 second feet flow for a year would produce 67,000 acre feet, which at the value assigned in Exhibit 26 would be $8.50
566 per acre foot, which seems somewhat low. In Exhibit 26, page 1, the second feet listed at the bottom of column 1 would produce 135,130 acre feet, which is more than the total quantity valued by Mr. George Anderson and included in his estimate, that quantity being approximately 107,000 acre feet.

Exhibit 25, page 1, item 2, going concern value as estimated by Mr. Metcalf excluded upon the theory that it is going concern value according to my definition thereof, and not development expense as defined by me. If I am wrong in this, and it represents development expense, I think it is excessive. If as a matter of fact it represents development expense as defined by me, it ought not to be excluded, except that part of it, if any, which represents an excessive allowance. The item should not be entirely excluded unless develop-

ment expense has been elsewhere included in their valuations. If Metcalf and Anderson have added nothing which is included in the valuation of physical items on account of development expense, then a separate item covering that element of value should be included in the total.

Exhibit 25, page 1, item 3, is more fully explained on sheet 2 of said exhibit.

We deducted Sullivan reservoir, both lands and structures. It is not at present used as part of the plant, although it might be so used. It would be good practice on the part of the company to make use of it in connection with an enlargement of the plant. In our report to the Public Utilities Commission we considered the use of the Sullivan reservoir in connection with storage and the operation of the system by gravity. We had in view the use of the Sullivan reservoir as one of the reservoir units for that purpose, and spoke of plans made by The Denver Union Water Company and conduit lines surveyed, which would so utilize the reservoir. We regarded those plans as feasible, and as plans to be recommended to one owning the Sullivan reservoir and the rest of the Water Company's plant.

In our report we also gave consideration to plans for utilizing Sullivan reservoir by the construction of additional galleries on Cherry Creek. These plans also would be feasible. Under those conditions I do not know whether Sullivan reservoir as it exists is a desirable part of the plant, to take care of future changes which we estimate will be necessary in the reasonably near future. The reservoir has, of course, a great deal of money expended on it, but it will require a great deal of improvement to make it available in any system. However, it is my opinion that in a rate making case it can properly be excluded.

567 As to the exclusion of the water power pumps at West Denver, the rated capacity of the two remaining steam pumps would be approximately 12 million gallons daily. Although water is pumped and furnished from that source frequently at the rate of 12 or 13 million gallons daily, nevertheless, according to my idea, that would be a sufficient provision of pumping capacity. Even though less than the peak load capacity, I think that with the other sources of supply that is a sufficient provision. But if one of the steam pumps broke down it would not be possible to pump the peak load from that station. Nevertheless I should consider that it was well up to the average in having capacity to supply the peak load for short periods, and a capacity largely in excess of the average furnished from that station. Not aware that the average in 1910 was 10 million gallons per day, and in the month of June 15 million gallons a day. Not aware that in June and July, 1913, the average daily withdrawal from that station was 15 million gallons, the same thing being true in 1912 and in 1911, in those months. Notwithstanding those facts, we do not think that any supplemental pumping capacity should be supplied at that station.

Exhibit 25, page 5, item 20-A was included in our own valua-

tion, or rather was not excluded from it. If we had had more time we would probably have excluded it.

We did not intend to exclude all of the lots on Cottage Hill. If that has been done here, the exhibit should be corrected.

Item No. 27, page 5 of Exhibit 25, Lake Archer canal and conduit lands, covers all of such lands, and excludes the entire value thereof as shown in Exhibit C. The galleries themselves are in any event to be retained, as well as a right of way for the conduit. Lake Archer and its canal are excluded upon the theory that the water power pumps at the West Denver station are to be excluded. I consider the exclusion as made here erroneous, even upon that theory, inasmuch as it excludes also the galleries and the conduit right of way.

As to the exclusion of all of the ranch lands, that portion of the same occupied by the conduits ought not to be excluded. The exclusion of the remainder is based upon the theory that they are unnecessary to the proper maintenance of the water rights. If it is necessary or advisable to retain them for the protection of the water rights, they ought not to be excluded. Even if the law be doubtful on that point, it would be prudent to retain them. If excluded, the income and operating expense and taxes pertaining thereto should also be excluded.

Exhibit 25, page 1, item 4 is explained in detail on page 6 of Exhibit 25. It merely represents a difference between the net reconstruction cost of the distribution system as estimated by Met-
568 calf and Anderson and by ourselves, the difference being here deducted.

Exhibit 25, page 1, item 5 is explained on page 7 of Exhibit 25. It merely represents the difference in the valuation of all the schedules, with the exception of the valuation of lands and the distributing system, which are separately considered, between the valuations of Metcalf and Anderson and those of our committee.

Our item of "Development Expense" was intended to include, among other things, the item designated in Exhibit C, page 64, "Preliminary expense and organization $120,000."

The deduction of item 5, page 1, Exhibit 25, taken in connection with the other deductions previously made, brings the valuation of the physical elements as found by Metcalf and Anderson down to the level of the valuation of the Utilities Commission.

Exhibit 25, page 1, item 6, the effect of that item is to assume as the valuation of the Lake Cheesman lands their assessed value for purposes of taxation, to-wit, $114,120. That assumption is not in accord with my judgment. We obtained the assessed valuation from the records of the counties, to the best of our ability.

Exhibit 25, page 1, item 7, calculation based upon annual depreciation at rate of $138,000, from which is deducted new construction or betterments during the period.

Exhibit 25, page 1, item 8, paving over mains. The amount here deducted was included in our own valuation, and still is. In my judgment it should be so included. Its deduction here does not

reflect my personal judgment. It was deducted at the request of the attorneys for the defendants.

Exhibit No. 27 represents certain computations made at the request of counsel, and upon assumptions the general outlines of which were prescribed by counsel in each instance. In that exhibit depreciation for the year 1913 does not include the contingent reserve testified to by Mr. Metcalf. That contingent reserve item of thirty or forty thousand dollars per annum is not included anywhere in Exhibit 27.

Percentage of net income upon a valuation of sixteen million dollars should be 3.053, instead of 3.53. It should be corrected.

Depreciation allowance for the year 1914 not taken from Mr. Metcalf's exhibit.

Gross revenue for 1914 was taken from Mr. Metcalf's Exhibit A-25. I did not consider the testimony as to what the actual gross revenue for 1914 has been.

I have assumed the same depreciation allowance throughout, to-wit $138,000, although various witnesses have testified to
569 higher rates, and although Mr. Metcalf testified that the depreciation allowance ought to be about ten per cent of the gross revenue.

In Exhibit 27 it was assumed that for the period 1914 to 1919 there would be no additions to capital account.

Gross earnings are taken from the forecast in Exhibit C, based on Metcalf's population curve. So far the population has not increased as estimated.

I have excluded the extra legal expense in 1914, but in my judgment the cost of the rate reduction case ought not to be so excluded.

Exhibit 27, sheet 4, revenue deficit table, explained. The tabulation is for comparison with Exhibit A-19, table 2, using six per cent instead of seven per cent as the fair return. The result shows the unreliability of this method of determining development expense when applied to a long period of years.

I am still of the opinion, as stated in our report to the Public Utilities Commission, that seven per cent, with one per cent added for depreciation, or a total of eight per cent, represents a fair earning at the present time, although in the earlier life of The Denver Union Water Company the rate of return ought to have been greater; and in my judgment that rate of return ought to be applied to the present fair value of the property. There is a difference between a reasonable rate of return and the cost of money fixed by the going rate of interest. One who furnishes a public utility service is entitled to something upon the present day value of his property in addition to the going rate of interest. The going rate of interest is one of the costs of furnishing the service, to-wit, the cost of money. In addition to that, the public utility should have something by way of profit, to cover the hazard of the business and things of that character. If the cost of money to a public utility is six per cent per annum, then something in addition must be added to make up the reasonable rate of return. What we start with is the cost of money to the particular utility, and to that rate per cent

must be added some additional percentage to cover the profit item, the latter depending upon the risks involved and other considerations going to affect the profit which the operator of the utility should get.

The cost of establishing the business, as distinguished from cost attached to construction of physical parts of the plant, should certainly be included in the rating base as part of the investment, unless it has already been amortized by reason of realization of more than a reasonable return. In that respect I distinguish between amortization of cost of building up the business and cost of physical parts of the plant.

570 Exhibit 27, sheet 5, "Revenue Interest Paid and Profits." Column headed "Interest" compiled from statements obtained by me from Water Company. Accrued depreciation deducted at foot of last column does not include abandoned property. I attach no special significance to this table.

Exhibit 27, sheet six, last table, represents profit on taps, with interest thereon to the present day at the rate of four per cent per annum, compounded annually. Do not know whether the company ever received such increment thereon.

The engineers of the Public Utilities Commission were engaged upon their work from some time early in August until about the middle of January following. We made repeated and careful inspections of the physical parts of the plant, as much as we could within the period. We caused the conduits to be exposed in a large number of different places, the places being designated by us, and we particularly designated the length of the trench, the dimensions of it, etc.; the openings to be six feet in length, so made as to expose the pipe for its entire circumference, and directed that three feet of that length be left without the earth cleaned off, and the remaining three feet the earth to be washed off the conduit. Those openings were made in the manner and at the points directed by us. We designated about seventy points to be so opened, and examined probably forty. These were distributed over the several conduits, the older as well as the newer conduits.

As the result of those investigations and inspections, we assigned to the conduits an estimated life, to which I have testified, and determined the accrued depreciation thereon, which our exhibits show. In our report to the Public Utilities Commission we referred to these examinations and their result, and concluded: "From these examinations we consider the assumed average life hereinbefore stated as conservative, under local soil, pressure and operating conditions." The assumed average life of the wood-stave conduits there referred to and as designated by us was 40 years. We meant by the expression that the actual average life of the conduits was at least 40 years in our judgment. We made a like inspection of other parts of the plant.

We also investigated the question of pressure and the question of service being performed by the plant, and our conclusions in that regard are set forth in our written report to the Public Utilities Commission.

We were hurried in our work by the Public Utilities Commission, or its members.

The exhibits presented by me are to be revised, recalculated and checked up.

571 I have had access to plaintiff's Exhibit C ever since it was introduced, but I have not checked up the estimates therein contained, nor critically examined the exhibit, nor analyzed the values or the computations or the bases of values as set forth in that exhibit.

Exhibit A-64, development expense tabulation from report of public utilties engineers, admitted as part of cross examination.

Recalled.

Direct examination:

Exhibit 54 sets forth Exhibits 19 and 25 as revised and corrected, and also some additional matters.

As to Exhibit 19, the paging is the same as in the original exhibit. A sheet, 6-A, has been added, showing the differences between the original and the present Exhibit 19, and sheet 15 has been added, showing engineering, contractor's profit and interest during construction.

As to Exhibit 25, contained in Exhibit 54, the paging is the same now as in the original Exhibit 25, except that there are certain added pages, to-wit, pages 8, 9 and 10.

In the revision of Exhibit 19 all of the original figures in the engineers' report have been checked over, computations carried out and additions made. The figures appearing in revised Exhibit 19, embraced in Exhibit 54, are the completed and corrected figures.

Sheet 6-A shows the difference in figures between original Exhibit 19 and revised Exhibit 19. The deductions made on sheet 6-A are the same as those made in Exhibit 23. The figures, however, have been corrected in the new exhibit. The difference I think is altogether in the item of land value.

Exhibit 54-19, sheet 7 and following sheets explained.

Sheet 10, Schedule F, the principal difference from the original exhibit is the item of West Side pumping station and equipment, in which the pumps in the original schedule were duplicated, causing an error of approximately $66,000.

Exhibit 54-19, sheets 11 to 14 explained.

Exhibit 54-19, sheet 15 shows, so far as it is possible to do so, in totals, the items of engineering, contractor's profit and interest during construction, included in the total. No interest during construction was included on account of Schedules A and B, being the land schedules. So far as the matter was considered by our committee, there was some difference in regard to it, and if there was to be any inclusion for that item, it was to be included under the general item of development expense. The idea was held that the increment in value of those lands covered the items of engineering and interest during construction. The matter was only briefly

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gone into, and it was allowed to go, if it should be included, in the item of development expense.

Exhibit 54-25, page 1, items 1 and 2, same as original exhibit; items 3, 4 and 5 changed to correspond with changes in corrected Exhibit 19. Item 6 of original exhibit has been omitted, and difference in land valuations included under item 8, page 1 of new exhibit. Item 3 shown in detail on page 2.

Exhibit 54-25, page 2, Schedule A, item 2, shown in detail on page 3, Schedule A-1. Item 3 shown in detail on page 4, Schedule A-2.

As to Platte Canon pumps, from all information we could obtain they had never been used, unless it might be that one of them had been alternated with No. 4 for use as a sand pump. That I could not be certain of at all, but they had never been used for general pumping into the system. This was one of the eliminations from our original valuation.

As to the exclusions at the West Denver station, this includes the exclusion of Lake Archer and Lake Archer canal, also the older portions of the pumping station, with its water turbines and all the water power equipment.

Exhibit 54-25, page 2, Schedule A, item 6, shown in detail on succeeding page 5, Schedule A-3. This differs in several respects from page 5 of original Exhibit 25.

All of these items were not excluded by us in our original report to the Public Utilities Commission.

This tabulation (Exhibit 54-25, page 2, Schedule A, item 6, and page 5, Schedule A-3) does not represent the determination of the committee. It was prepared at the request and suggstion of counsel for the purposes of this case. It covers items for deduction not deducted in our original report.

Exhibit 54-25, page 6, Schedule B, explained.

54-25, page 7, explained.

The final item of net difference is the item shown as item 5 on page 1 of Exhibit 54-25.

54-25, page 8, Schedule D, shown in further detail on page 9, explained. The final figure on page 8 is item 8 on page 1 of Exhibit 54-25.

Exhibit 54-25, page 10 (marked Exhibit 25-54) explained. It is a comparative table, showing comparison between estimates of the public utilities engineers and of Metcalf and Anderson, the latter as shown by plaintiff's Exhibit A-22, exclusive of water rights and of going concern value. It also shows the comparison according to the figures in Exhibit C. The two valuations, to-wit, that of Metcalf and Anderson and that of the public utilities engineers, were
573 not made up in exactly the same way, and it is very difficult to co-ordinate them.

On the Capitol Hill reservoirs, the total excavation figured by us was 79,900 cubic yards, at 16 cents, and 41,860 cubic yards of embankment at 19 cents. To this contractor's profit should be added. At the West Denver reservoir 11,000 cubic yards at 20 cents, to which contractor's profit at 15% should be added.

We have endeavored by Exhibit 54 to correct said errors in former exhibits.

Recross-examination:

The net result of the corrections made by Exhibit 54 is to decrease our total by over $161,000. Practically all of this accounted for by clerical errors in the former exhibits.

Exhibit 54-19, sheet 2, Schedule A, item 26, valuation omitted in former exhibit; present valuation determined by the committee.

I do not know whether any member of the committee has knowledge of values in the vicinity of Morrison. Personally I do not assume to be versed in such values.

54-19, sheet 7, Schedule C, "Structures." A very considerable reduction has been made in the new exhibit, applying to almost every item. This was necessary by reason of errors in calculation originally occurring. The original errors were in the original item of replacement cost before the application of overhead. They were not errors in quantities nor in applying the wrong unit price, but in multiplication and addition.

The difference in Cheesman reservoir is accounted for by a double inclusion of contractor's profit on the item of masonry, amounting to $62,668.

On Cheesman reservoir we allowed no contractor's profit on the cement. The sum allowed for cement was $278,050. The engineering percentage was applied to the cement allowance. I think a contractor would be satisfied with a profit of 15% on a basic figure arrived at by excluding the item of cement.

I am not able to explain the difference on the item Marston Lake reservoir between Schedule C of original Exhibit 19 and Schedule C of Exhibit 54-19.

Exhibit 54-19, sheets 8 and 9, Schedules D and E, explained.

54-19, page 10, Schedule F. Difference between original Exhibit 19 and this accounted for by duplication in original exhibit of pumping units.

Exhibit 54-19, page 11, Schedule G, explained.

574 Exhibit 54-19, page 12, Schedule H, explained. In the original schedule engineering had been omitted.

Exhibit 54-19, page 13, Schedule I, same as original exhibit. No addition made on account of any overhead costs or expenses whatever, notwithstanding Mr. Flood's testimony. This because Mr. Allen stated that there was a great deal of stock carried over for some time, and we regarded that as a sufficient offset, without making any actual determination.

Exhibit 54-19, page 14, Schedule K, explained. Do not think overhead should be added on first seven or on the twelfth item, because I think the figure of replacement cost given is sufficient to include those items. Our committee did not value all of those items, Mr. Flood valued some of them.

Exhibit 54-19, page (or sheet) 15. As to interest during construction and overhead charges on the lands, my view is that original cost plus actual interest during construction and overhead should be

taken, and from this the appreciated value of the lands deducted. It was impossible to make that computation, therefore we considered that the general allowance of development expense might cover any such difference. Our theory was that appreciation in value of the lands ought to be offset against interest during construction, engineering and other like overhead charges; also that those items, including taxes during construction, are items to be applied only to the original cost of the lands, and not to their present day value.

As to interest during construction on the structures, covered by Schedules C to H inclusive and Schedule K, the basic rate used was six per cent per annum. My former testimony to the contrary was a mistake. I formerly stated that the net amount arrived at by deducting interest on bank balances was four per cent per annum. That was incorrect, except as to the distribution system, and even in that case, while it was applied for half of a period of 4.2 years, it would be equivalent to interest at six per cent on half of a construction period of 2.8 years, which is practically three years. As to all other schedules, a net rate of six per cent per annum is used, without any deductions. As to Lake Cheesman, we applied a rate of six per cent per annum, and assumed a construction period of about 2½ years; or about 2⅔ years I think. It actually took longer than that to construct Lake Cheeseman, but I do not believe that the work was prosecuted with all the vigor that would be used if it were carried out as part of the complete system.

We assumed that the entire water works system was to be reproduced. Under such conditions, the constructor would have to have a very considerable part of the total amount needed for construction on hand at the time of commencement of work on the
575 system. We have dealt with each separate element of the system as though each, such as the distribution system, Lake Cheesman, the conduits and each of the other elements, was going to be financed and constructed as a separate proposition.

We have dealt with the elements as nearly as possible in the order of their construction. For example, Lake Cheesman would be begun during the second, possibly during the third, year of the period of construction of the entire system. We assumed that the money was not all advanced and in hand at the beginning of the construction period of the system, but was made available as construction progressed. We made no specific assumption as to how much would be in hand at the time of the beginning of the construction period. We assumed that as to each of the separate elements of he plant interest during construction began to run at the time when the work of construction on that particular part of the plant began. Our assumption was that the builder would not have in hand a substantial part of the total cost at the beginning of the construction, but would have financial arrangements made to get his capital in relatively small amounts, perhaps at six months, nine months or yearly intervals. I think it is quite usual to have an enterprise of that sort financed in that way. Under those conditions the builder would never have on hand or in bank any particular large sum of money.

Some plan of underwriting the bonds by a syndicate is what I have in mind. Such a syndicate I presume would require compensation. If such a banking syndicate required compensation for such an arrangement, that would be a part of the cost of getting the money. In some instances in my experience the banking syndicate has received its compensation in stock of the company, that is to say, in the speculative end of the enterprise.

I have never been connected with an underwriting of such a character and involving such amounts as would be necessary to reproduce this water works plant.

Under the method assumed, there would not be any considerable return by way of interest on bank balances; not nearly so great as if the owner-builder had supplied himself at the beginning of his enterprise with a considerable amount of the cash required.

We assumed approximately four years as the entire period of construction, and that the Marston Lake filter, for instance, would be built in the last year. Practically all of the structures in Schedule C, except Lake Cheesman, would be built in the last year of the four. For Lake Cheesman we estimated a period of
576 construction of $2\frac{3}{4}$ years, construction to begin during the second year of the four year period.

For the entire system I estimated one year for surveys, specifications and plans, and actual construction to begin during the second year. I did not assume that all of the items of the plant would become active component parts thereof at the same time.

I did not assume that work would be carried on so that interest during construction would cease at the same time on all parts of the plant. I did assume that certain portions of the plant would be in service before the end of the four year period. I cannot state what parts of the plant were so assumed.

Interest during construction must continue as to any particular component part of the plant until it becomes an active element. I cannot state what my assumptions were as to the time when any of the elements of the plant would become active.

I do not remember in what year of the construction period of four years the conduits would have been built. The conduits and the infiltration galleries would probably have been completed at about the same time. I cannot state what my assumptions were in that regard. I imagine the conduits would be completed before Lake Cheesman. In our theoretical reconstruction an approximate estimate was made as to when these various structures would be completed; but I am totally unable to state now what that was, even approximately, and cannot say who could.

We assumed that the conduits would probably come into service successively. I cannot state what the assumption was in that regard, but in all probability some of them would be in service prior to the completion of the whole plant, and others would come into service during the latter part of the period of construction. A portion of the system would be in service probably considerably before the four year period expired. I could not say how much before. In making up our estimate we made up a general schedule

on that subject, but not a definite one, because that would involve the development of an entire plan of construction, which was not done.

We dealt with the matter of interest during construction as to each element by itself. On Schedule G, the distribution system, the aggregate percentage of interest during construction was 8.1%. The detail of that is explained in Exhibit 24. We started with a basic rate of six per cent per annum and deducted two per cent for interest on bank balances, giving a net rate per annum of four per cent, which we applied to a period of 2.1 years. If we had applied the same method regarding interest during construction to Schedule G as we did to the other schedules, and figured it at the rate
577 of six per cent for that period, the amount would have been increased by $178,716.

The distribution system was not the first of the component parts of the plant upon which we figured interest during construction, but after that schedule was completed we thought too much time had been allowed, and we thought the overestimate of time offset the underestimate of annual rate of interest, so, being hurried, we left it as it was. Otherwise we would have made the period of construction for the distribution system somewhat shorter and stated the interest rate definitely.

My recollection is not entirely clear, but it is that this was the first item upon which we figured interest during construction. If I just made a statement to the contrary, it was inadvertently made.

If we had shortened the period and increased the rate to six per cent, we would have taken a total period of 2.8 years and would have computed interest at the rate of six per cent per annum for half of that period.

Construction work on the distribution system would commence very shortly after the plans were completed, and it would be one of the last to be completed, although some portions of it would be in service before the completion of the system.

If we had applied the rate of six per cent per annum to the average period of 1.4 years we would have made no deduction for interest on bank balances.

As to Schedule H, buildings, our assumption was that they would be completed from time to time throughout the period of construction. We assumed a period of construction for each building of one year; interest at annual rate of six per cent, with no deduction for interest on bank balances.

Schedule K, assumed a rate of six per cent per annum, with no deduction for interest on bank balances.

As to all of these schedules, except Schedules A, B and I, where no allowance was made for interest during construction, the allowance in every case, except as to the distribution system, was based upon a rate per cent per annum of six per cent, without any deduction for interest on bank balances; but as to the distribution system, Schedule G, we assumed a rate of six per cent per annum and reduced it by two per cent because of supposed interest on

bank balances, leaving a net rate per cent per annum of four per cent.

The statements now made in testimony relative to interest during construction and methods of its calculation are inconsistent with statements contained in our report to the Public Utilities Commission (quoted in full in original transcript). Those sections of the report were written before most of these calculations were made, and were not subsequently changed.

578 My present statements are inconsistent in this regard with the testimony given by me when formerly upon the stand (quoted in full in original transcript), but my former testimony was wrong in that regard, except in the case of Schedule G. All of the testimony which I then gave repeatedly, both on direct examination and on cross examination, when on the stand before, in that regard was erroneous, except as to Schedule G. As a matter of fact, we did not then, and do not now, make any deduction on account of interest on bank balances except in respect to Schedule G.

As stated yesterday, the amount of interest during construction on the distribution system would be the same whether calculated on the basis of an average period of 2.1 years at four per cent, or 1.4 years at six per cent; and if the shorter period were assumed, there was no deduction for interest on bank balances.

When formerly upon the stand I stated repeatedly that I was unable to answer questions because detailed data had been destroyed. Since then I have discovered that one of my assistants, who made most of the computations, definitely remembered what was done and had memoranda thereof, and with his assistance I made the computations.

Exhibit 54-25 explained.

It follows as the natural inference from what I have said that at the present moment I am unwilling to say that in my judgment the amount stated as the final result after making deductions, as the same appears on page 1 of Exhibit 54-25, is the fair, just and proper result.

Exhibit 54-25, page 5, Schedule A-3, item 27. The difference between that item and the corresponding item appearing in original Exhibit 25 arises from the fact that we now permit the company to retain in its valuation the Mississippi gallery lands and the conduit right of way. These are valued at the rate specified in Schedule G; at about an average rate of $1,500 per acre. I have not taken into consideration the added cost of obtaining a mere right of way through these lands, instead of obtaining the lands in the large parcels in which they are held, as testified about by Mr. Armour Anderson and other witnesses.

The net result of Exhibit 54-25 is simply this: That first we deducted from Metcalf and Anderson's valuations certain specific items, then we deducted from Metcalf and Anderson's valuations their excess over our valuations, as to all of the other items in all of the schedules, and so arrived at the result shown on Exhibit 25. It simply amounts to an assumption that according to our view, or according to counsel's view, or according to some possible construction of law which may

be applied by the Master, certain things which have been val-
579 ued ought not to be valued and included in the rating base, and therefore are to be deducted; and that as to the remainder, any difference in valuation which may exist between that found by Mr. Metcalf and Mr. Anderson and that found by ourselves, as to the remaining property, ought to be deducted from Metcalf and Anderson's valuation.

Item No. 6 appearing on page 1 of original Exhibit 25 has been entirely eliminated. As the deduction is now made on account of Lake Cheesman, the amount deducted is the difference between our valuation on Lake Cheesman lands and that of Metcalf and Anderson, so that in the new Exhibit 25 we have deducted about twice as much as in the former exhibit on account of Lake Cheesman lands. I am not now able to state just why I used the other method before.

Exh-bit 54-25, page 1, item 8, did not appear in former Exhibit 25. By reason of this new item we are now deducting an additional amount of $80,000 on account of Lake Cheesman lands, and an additional amount on account of other lands of approximately $80,000, which we did not deduct at all in our former exhibit. The additional deduction here made is approximately $150,000.

Exhibit 54-25, page 8, Schedule D, "Water right values included" by public utilities engineers. Details shown in part by following page 9, which covers approximately one-half of the total.

$60 per acre was our standard valuation for first class water rights. Exhibit 54-25, page 8, Schedule D, further explained.

If Mr. Wall and Mr. Bowles have testified that they did not twice value the Woodbury tract, otherwise designated as Tract No. 15, Arapahoe, then there is no occasion for the note relating thereto in Exhibit 54-25, page 10, at the foot of the page.

Exhibit 54-19, sheet 7, Schedule C, items Capitol Hill Reservoir and Capitol Hill Reservoir Lining do not cover all the estimated reconstruction cost of all parts of the Capitol Hill reservoirs. I think these cover the excavation, embankment and concrete lining only. They do not cover the roofing, outlet, pumps, packing and things of that kind.

It would be possible, but somewhat difficult, to furnish an itemized statement of our estimated cost of reproduction, gross and net, of all the items that go to make up the Capitol Hill reservoirs, and I will make up that statement and present it to you if Mr. Nye so instructs.

Probably the difference in our respective valuations largely arises through the difference in amount of excavation. These quantities
were figured by Mr. C. P. Allen for the committee. We
580 assumed that all of the material excavated went into the embankment. If this is not so, there should be an allowance for hauling away the waste material.

Redirect examination:

"Q. Upon what basis did you consider the construction of the plant, in respect to whether or not it was to be now constructed with

the streets encumbered with pipes as they are, or whether it was to be constructed without such encumbrances?

A. Our final determination was that it was to be considered as if nothing existed—no obstruction existed."

"Q. It was upon that basis that you made your calculation?

A. Yes sir."

The total amount of interest during construction as allowed by us represents six per cent upon two and a half million dollars for each of the four years, or ten millions for one year, or half of that amount for two years.

Recross-examination:

If there was a construction cost in each of the four years of the construction period of two and a half million dollars, then we have computed interest on each of these instalments of two and a half million dollars at six per cent for one year. As to interest on the first two and a half million dollars for the following three years, on the second two and a half million dollars for the following two years, and on the third two and a half million dollars for the following one year, it would be assumed that one-fourth of the plant would be in action at the end of the first year, one-half at the end of the second year, three-fourths in three years, and the remainder in the fourth, and earning a revenue. We did not enter into the question as to whether the revenue would be sufficient to offset the interest on the amount which had been invested, and I would not be able to state whether it would or not.

JOHN E. FIELD.

Direct examination:

State Engineer since 1913. Formerly State Engineer in 1897 and 1898. Civil engineer. Graduate Sheffield Scientific School of Yale in 1888. Practiced continually since in Colorado and the West. For past twenty years almost exclusively in irrigation and hydraulics, in work connected with water rights, appropriation of waters and
581 their use in irrigation. Member Field, Fellows and Hinderlider, Engineering Company, of which A. Lincoln Fellows is also a member.

1902 to 1907 engineer of United States Reclamation Service, in charge of work in Southern Wyoming and Nebraska. Investigations for North Platte project under my direction. Also construction work in connection with Pathfinder reservoir, up to foundations, tunnels and outlets. Expenditures about $3,500,000. After that private practice in Denver, service extending into Wyoming, Utah, Arizona, Texas and Nebraska. Investigation, passing upon feasibility of projects, estimating value of lands and water rights, etc. Where projects constructed often acted as construction engineer. First one during that period in San Luis Valley, covering about 34,000 acres. On Western Slope project near Rifle, covering 10,000 acres, canal about 30 miles long.

In connection with irrigation matters, on South Platte. Some work

on Henrylyn. Also consulting engineer on several projects, especially when they got into trouble.

I think I have considered the flow of the South Platte and all of its tributaries. Quite thorough investigation of flow and use and duty of water on Laramie River. Have examined and considered the flow in various other streams.

Some experience in reservoir designing and construction. Made first plans for Pathfinder dam, which were afterwards altered very little. That is a stream-bed dam, constructed of masonry. Capacity in Pathfinder a little over a million acre feet.

As to administration of water supply for irrigation purposes in Colorado, State Engineer at head. Distribution according to courts' decrees. Immediately below State Engineer are five division engineers, one to each main water shed. Under each division engineer are the water commissioners, each having charge of a section of the main stream or one of the tributaries. Water commissioners have deputies. Whenever shortage of water, division engineer must determine and regulate between various districts.

On South Platte River, beginning at the head, District 23, in South Park; below that District 8, from mouth of canon to Denver; below that District 2, from Denver to mouth of Cache la Poudre; below that District 1, and beyond that District 64.

As between these districts, for example, if a junior ditch in an upper district is drawing water and a senior ditch in a lower district needs it and cannot get it, the junior ditch must be shut down. Moreover, ditches on the tributary streams must always be considered, and a junior ditch on a tributary not permitted to receive water
582 when a senior ditch on the main stream below is needing it. That is principal duty of division engineer. He also hears complaints of injustices or discriminations practiced by the water commissioners. State Engineer gives directions to division engineers, and complaints concerning water commissioners or division engineers are brought to him.

State Engineer also has under him a number of hydrographers, who measure the streams, rate the ditches, and furnish data and information upon which distribution of water is made. This is transmitted to the division engineers and also to the water commissioners.

State engineer also supervises construction of dams over ten feet in height*b*. Also limits the amount of water which may be stored in a reservoir by reason of possible weakness of structure. State Engineer may disapprove determinations of division engineers.

Heard testimony of George G. Anderson and Charles W. Comstock. Have examined and considered transcript of that testimony and various exhibits offered in connection therewith.

As to Exhibit A-32, presented by Mr. Anderson, my attention attracted by Mr. Anderson's statement that average annual storage about 57,000 acre feet. Having made previous examinations of the efficiency of Lake Cheesman, I thought this must certainly be an error. Examination of Exhibit A-32 shows amounts of estimates very much too high. We have not sufficient data to examine critically all of the years. Data quite complete from years 1909 to 1913.

1909 year of large flow, certainly yielding full reservoir.

1910 examined in connection with weekly reports of water commissioners. For 1910 weekly reports of water commissioners show that latest ditch receiving water in District 2 between April 2nd and end of year was Burlington ditch, and from April 1st to October 31st it received only at rate of 150 cubic feet per second. Therefore no water could have been stored in Lake Cheesman during that period.

Weekly reports of water commissioners in 8 show that Highline ditch receiving an insufficient supply; therefore at least 10,000 acre feet should be deducted from Anderson's estimate for 1910. This is probably too small a deduction, because Anderson made no adequate provision for direct flow rights of the Water Company.

As to 1911, water commissioners' reports for District No. 1 show that no water could have been stored in Cheesman between May 1st and November 7th. Water commissioners' reports for District 2 show the same thing. Water commissioners' reports for District 8 show that no water could have been stored between April 1st
583 and October 1st. In July, 1911 commissioners' reports show a serious shortage in Districts 1, 2 and 8. Also storage allowed by Anderson for October should be partially reduced, and from his total for 1911 18,000 acre feet should be deducted. And if proper consideration given to demands for direct flow rights of Water Company, the storable quantity should not exceed 9,000 acre feet in 1911.

As to 1912, the demand was such, as shown by water commissioners' reports, that amounts estimated by Anderson should be largely reduced. Demand is the quantity of water necessary to supply the needs at the particular time, limited by the amount of the decree. Unsupplied demand is the difference between what the ditch actually got and what would be necessary to fill its needs. When I speak of demand in reference to districts I mean unsupplied demand.

According to water commissioners' reports in District 8 for 1912, Creesman storage estimated by Anderson for May should be entirely eliminated, for June almost entirely, for July reduced only for week between July 20 and 27, and for August for week between 17th and 24th. No water could have been stored in the last week of August. All of September, and all of October up to the 19th should be eliminated. Anderson's figures 65,000 acre feet in excess of what it should be. As sufficient allowance not made for direct flow rights of Water Company, in my opinion at least 80,000 acre feet should be deducted.

As to 1913, had not seen Mr. Anderson's Exhibit A-32 until this moment. Nevertheless, can examine it just the same. I can say at this time that storage for 1913 should not have been more than 34,592 acre feet.

It therefore appears that for all the years which we can critically examine, figures in Exhibit A-32 are very much in excess of what could actually have been stored. Therefore it is reasonable to assume that all of the other years contained similar errors, the method of calculation being the same. (Motion to strike out assumption granted.)

As to years prior to 1909, examined all years except 1900 and 1909,

in each of which flow was so large as to certainly fill reservoir. From an examination of all of the other years I found that the estimates in Exhibit A-32 were "very much in excess of what they should be."

Prior to 1909 the records are less complete than they are subsequent to that year. Omitting 1900 and 1909, the other years prior to 1909, according to my estimate, were such that the storages estimated by Mr. Anderson in Exhibit A-32 were 25% in excess of what they could have been, deducting which from his average annual storage leaves 43,570 acre feet.

584 Also examined the tables furnished in connection with the testimony of Mr. Comstock, particularly Exhibit A-54. Examined somewhat more extensively than A-32. This examination covered years 1909 to 1913. For reasons given in connection with Exhibit A-32, found average excess 28%. To be liberal, called it 25%. 1909, full reservoir. 1910, must eliminate all storage for May, all for June, all for July, all for August, and first 15 days of October. Deducting these amounts leaves 43,480 acre feet.

In 1911, must eliminate all storages for May, June, July, August, September, October and a portion of November, also storages between April 11th and April 20th, making in round numbers 40,000 acre feet to be deducted, leaving approximately 13,000 acre feet as possible storage for that year.

As to 1912, a year of large and steady flow, but discharge so evenly distributed amount storable less than one would suppose. It was a year of very satisfactory supply. Ditches received water in a very satisfactory manner. This year more nearly approached the ideal condition for direct irrigation than any of the other years mentioned. If equal amount of water had flowed in a more erratic way, more water could have been stored; less water would have been diverted in periods of low flow for direct irrigation, and a greater surplus would have existed during extreme high floods.

In 1912 Cheesman could not have been filed. There must be eliminated from Comstock's estimate 70,672 acre feet, leaving 72,976 acre feet as possible storage in the year 1912.

As to 1913, deductions should be made from Comstock's estimate as follows: May 1814 acre feet, June entire estimate, July entire estimate, August entire estimate, September 12,222 acre feet, total 64,956 acre feet, leaving 46,860 acre feet, maximum possible storage for 1913. Even in these figures, sufficient consideration not given to Water Company's direct flow rights.

As to percentages of excess shown by Comstock's estimates, 1910 15%, 1911 35%, 1912 10%, 1913 40%; average percentage over 25%. Reducing Comstock's average possible annual storage, 62,979 acre feet, by 25% leaves for the corrected amount 47,234 acre feet, as compared with corrected amount for Anderson of 43,000 and odd acre feet. The difference is not so great considering the different methods. Difference probably accounted for by Comstock's taking stream flow corrected for actual Cheesman storage, which Anderson did not do.

As to 1912, in criticising Anderson's Exhibit A-32 I deducted 80,000 acre feet. I desire to correct this. The amount to be

eliminated should be 75,000 acre feet, leaving percentages
585 of excess on Anderson's figures in Exhibit A-32 as follows: 1909 no per cent, 1910 20%, 1911 70%, 1912 5%, 1913 50%, making an average percentage of excess for those years of 29%, which I have taken as 25%.

As to Anderson's figures, Exhibit A-32, for year 1913, upon consideration of water commissioners' reports found that between May 10th and October 10th no water could be stored, leaving as possible storage for that year 33,668 acre feet.

Exhibit A-52, Comstock, also examined and analyzed. Table 1, error to omit Epperson, or Green Valley, ditch, with a decree of 2.25 cubic feet per second. Also in error as to decree of Platte Water Company's ditch; first decree at least 34 cubic feet per second, figured from data given in decree; second decree should be 43, instead of 13, second feet, if interpreted like that of the Platte Canon ditch.

Exhibit A-52, table 2, shows actual diversions without allowing for unsatisfied demands. Unsatisfied demands in Platte Water Company's ditch (City ditch) not very great. Users generally purchase 1 inch to the acre, that is 1 cubic foot per second to 38.4 acres. I have assumed that actual diversion under City ditch represents needs. Exhibit A-52, table 3, shows actual diversions, but not needs or desires. I assume average diversion to represent demand. A-52, table 4, assumes average diversion represents demand; table 5 assumes average diversion represents demand. Table 6, Brown ditch, supplied by seepage and inflow, places no demand on canon, and therefore eliminated in my determination.

A-52, table 7, Last Chance ditch, average diversion shown less than actual demand.

A-52, table 8, Northern Colorado (Highline) ditch, frequent unsatisfied demand; average diversion shown does not represent this. In my opinion demands of this ditch 75,000 acre feet per annum. I have assumed this figure as "being the desires of this canal." A supplemental reservoir supply which Highline now has possibility of securing will increase demand for direct supply. This will curtail the amount which can be stored in Cheesman.

In my determinations I have used the averages shown in Exhibit A-52, tables 2 to 5 inclusive, as showing demands for those ditches respectively. Have excluded average in table No. 6, the Brown ditch, and have used the average for the Last Chance ditch shown on table 7. Have given a modified figure for the Highline, shown on table 8. Have also eliminated Petersburg ditch, table No. 4, as placing no demand on the canon.

586 Exhibit A-52, table 9, excepting the Brown and Petersburg ditches, nearly all water required by ditches here listed must come from canon. Therefore 1909 required 274.25 cubic feet per second, and 1913 313 cubic feet per second of canon water. Distributing this according to Comstock's monthly percentages gives amount for each month of 1913 more than he allows for both districts 2 and 8, and for 1909 slightly less than he allowed for both

districts, showing that his estimate of amount of canon water required to supply these priorities "was very much too low."

Exhibit A-52, table 10. This table does not appear to permit of means or averages being taken, because all ditches are not reported upon in each year. Only the more recent years should be taken. Moreover, in many years there was an unsatisfied demand. Taking the average of the last five years we have an average annual diversion of approximately three acre feet per acre. This period includes two years of low flow when there was a large unsatisfied demand.

The use of three acre feet per acre does not seem to me unreasonable, considering the character of the farms and crops and the fact that these are very old ditches and "can get water when they want it and need it." "I have known many old ditches which used 9 and 10 acre feet per acre, and still holler for more, but such a use, of course, of nine acre feet is excessive." My experience is that where people get three acre feet per acre, it is generally an ample supply, but not an excessive supply.

As to needs of District 8, taking average diversion for the City ditch, Nevada ditch, Platte Valley ditch and Last Chance ditch, omitting Brown and Petersburg ditches, assigning 66 second feet to direct flow rights of Water Company, assuming needs of Highline to be 75,000 acre feet, annual demands on canon would be 156,210 acre feet. This is about twice Comstock's allowance.

Exhibit A-52, table 11. In view of my criticisms on table 10, this table is of no value, being based on annual consumption of 76,000 acre feet, as against 156,210 acre feet as determined by me.

Exhibit A-52, table 12. Table incomplete; does not show gain in some months and loss in others. Showing algebraic sums only. To make table of value, should take gain or loss for each day in year. Otherwise, you have gain in one day held over to make up loss in succeeding day, which, of course, is impossible. Water already gone by cannot be diverted in the ditch. Defendants' Exhibit 29, prepared by me, covers same period as Exhibit A-52, table 12, and shows gain or loss by months.

587 Said exhibit explained. If monthly gain or loss had been considered, and gains ignored, the average of loss between the two stations would have been 71,013 acre feet, instead of 49,542 derived from Comstock's Exhibit A-52, table 12. And using the monthly basis and ignoring gains, the average loss during the months of irrigation between the two stations would have been 58,605 acre feet.

Exhibit A-52, table 15. As State Engineer, I have established the making of seepage measurements. Seepage return is a very important item in the use and in the supply of water in the South Platte drainage. Water returned to river from Denver sewers or from any tributary not included in seepage. Seepage return is at a fairly constant rate throughout the year, although there is some variation at certain periods.

Exhibit A-52, table 15. Error to apportion tributary inflow on same ratio as seepage between upper and lower District 2. More tributary inflow in lower than in upper District 2.

Exhibit A-52, table 13. Three acre feet per acre does not seem an excessive amount. It is ample, but I would not consider it wasteful, because a large part of the land under these ditches in District 2 is gravelly, and most of the ditches are quite old.

The use or duty of water depends upon acreage handled. Water handled more economically on large acreages. Duty of water influenced by reliability of supply. If ditch likely to be shut down later in season, users will divert every bit that they can get in the early portion of the season, in effort to tide over inevitable dry period. So in ditches like Highline users will divert early in season all the water that they can get the soil to hold.

As to upper District No. 2, I believe that 135,000 acre feet annually would supply the necessities.

Exhibit A-52, table 16, same objection as to table 15, although possibly error not so great, as district quite short.

According to my estimate, demand for District No. 8 upon the canon annually amounts to 156,210 acre feet. Apportioned to the several months of the irrigation season, and excluding the 66 second feet required for Water Company's direct flow rights, this would be: April 90 second feet, May 261 second feet, June 450 second feet, July 438 second feet, August 349 second feet, September 180 second feet, October 90 second feet. To this the Water Company's 66 feet must be added for each month. The percentages used are: April 5%, May 15%, June 25%, July 25%, August 20%, September 10%, October 5%. In this vicinity the demand for April is not a
588 very great amount, but approximately five per cent of the season's demand. The figures given are the demands of District No. 8 upon the canon.

As to District No. 2, I have analyzed demands for 1912 and 1913 as shown by reports of water commissioners. Have taken into consideration inflow between canon and Denver; and have taken flow of stream past gauging station at Denver at such times as Burlington was receiving no water, or insufficient supply, as showing demand. When Burlington is getting all it needs rest of district is supplied. It may be assumed that the amount past Denver, with the Burlington insufficiently supplied, less seepage and tributary inflow in District 8, represents demand of 2 on canon. Taking water commissioners' reports, demands, inflow and records of stream flow at stations, I arrive at certain figures which in my opinion show the average demand each month of the irrigation season of District No. 2 on District No. 23 through District No. 8.

I took the years 1912 and 1913 as indicating the demand; took the stream flow on the same day when the water commissioners reported, on this point taking the hydrographers' reports instead of water commissioners' reports. For 1912 witness gives figures on diversion of water and demands in District No. 8 as stated in water commissioners' reports.

For 1912 witness gives figures as to diversion and demand purporting to be from water commissioners' reports.

From the figures that I have given as to demand of District No. 2 and District No. 8 it is necessary to deduct the amount of return

flow in District No. 8 to arrive at demand on canon by District No. 2. I will reduce the figures which I have given to tabular form.

It is necessary at some time of the year to fill Barr Lake. That lake would naturally try to get water, if it was available, in the fall.

My figures of demand of District No. 2 on District No. 8 are as follows: April 150 cubic feet per second, May 400, June 700, July 700, August 500, September 300, October 300, November 300, December 150. As to seepage and return flow in District 8, which must be deducted, as shown by water commissioners' reports for 1912 it was: April 221 second feet—this is greater than the demand, which eliminates April—; May, seepage and return 231 second feet, leaving 169 second feet; June 106 second feet, leaving 594 second feet; July return 106 second feet, leaving 594 second feet; August return 106 second feet, leaving 394 second feet; September return 113 second feet, leaving 187 second feet, October return 137 second feet, leaving 163 second feet; November return 117 second feet, leaving 183 second feet; December return 103 second feet, leaving 589 47 second feet. These figures are for the year 1912 in both districts. Adding them together we have total demand on canon for both districts as follows: January 66 second feet, February 66 second feet, March 66 second feet, April 166 secon- feet—in round numbers 150 second feet—, May 510 second feet—in round numbers 500 second feet—, June 1180 second feet— in round numbers 1000 second feet—, July 1160 second feet—in round numbers 1000 second feet—, August 735 second feet—in round numbers 700 second feet—, September 433 second feet—in round numbers 400 second feet—, October 329 second feet—in round numbers 300 second feet—, November 249 second feet. I concluded to eliminate ditch demands in November and December, leaving for November 66 second feet, December 66 second feet, being the demand of the Water Company for its direct flow rights. The figures I have given for the demand are almost twice as much in each month as those of Mr. Comstock, accounted for in part by 66 cubic feet per second, demand of Water Company direct flow rights. Other differences due to fact that Comstock took actual use rather than demand, including possible unsatisfied demands, as his basis.

With foregoing figures of demand as basis, I have determined quantities storable at Lake Cheesman, taking as a basis of supply Comstock's figures shown in Exhibits A-53 and A-54. For 1900, a year of large flow, reservoir could have been filled. For 1901, records being incomplete, I have assumed that average storage could be made, the year being one of approximately average flow. Have therefore estimated 50,000 acre feet possible storage.

Exhibit 30 is a compilation of possible storage, beginning with the year 1902. Exhibit 30 explained. Basis: discharges at Lake Cheesman, as shown by Comstock in Exhibits A-53 and A-54; hydrographic records in State Engineer's office for 1900 to 1913; demands on canon, as shown by me, for Districts 2 and 8; these demands deducted from stream flow at South Platte before storage permitted at Cheesman; excess assumed storable at Cheesman, to

the extent that recorded stream flow in South Fork would furnish same.

1902: took Comstock's figures for January and April; February, estimated, in absence of record of stream flow at South Platte—also March; April to October inclusive, calculated on my estimate of demands and recorded stream flow; November and December, estimate, in absence of recorded stream flow.

In 1903: January and February estimated, in absence of recorded stream flow at South Platte; March and April, took quantity of actual storage as shown by Water Company records; May
590 to December inclusive, calculated on my estimate of demands and recorded stream flow.

December, 1903, quantity withdrawn by company may have been withdrawn to keep river channel free from ice, which was their custom.

Subsequent to March, 1908, used corrected stream flows as shown by Comstock's Exhibit A-53; figures for inflow at Lake Cheesman taken from report of engineers of Public Utilities Commission.

Exhibit 31 is copy of table found in report of public utilities engineers, showing inflow and outflow at Cheesman.

Exhibit 30, year 1904. January and February, Comstock's figures; March, took actual storage; April to November inclusive, calculated on my estimate of demands and recorded stream flow; December, actual storage.

1905. Year of comparatively large flow. January, February, March, April, November and December, Comstock's figures; May to October inclusive, calculated as before stated.

1906. Practically no actual storage occurred. January, February, March, November and December, took Comstock's figures; April to October inclusive, calculated as before stated.

1907. A year of quite large flow. January, February, March and December, took Comstock's figures. Other months calculated as before stated.

1908. Comparatively low flow. January, February, November and December, took Comstock's figures. Other months calculated as before stated.

1909. Not specifically analyzed. Year of very large flow. Reservoir could have been filled to capacity.

1910. January, February and April, took Comstock's figures. Other months calculated as before stated.

1911. Year of comparatively small discharge. All months calculated as before stated.

1912. A year of quite large flow, but of comparatively uniform flow, as previously stated. For December took Comstock's figures. Other months calculated as before stated.

1913. South Platte records not complete. January, February and March, took Comstock's figures. Other months calculated as before stated.

Recapitulation of estimated possible storage at Lake Cheesman: 1900, 79,064 acre feet; 1901, 50,000 acre feet; 1902, 11,888 acre feet; 1903, 19,336 acre feet; 1904, 24,639 acre feet; 1905, 78,490

acre feet; 1906, 70,344 acre feet; 1907, 72,088 acre feet; 1908, 11,390 acre feet; 1909, 79,064 acre feet; 1910, 47,408 acre feet; 1911, 9,830 acre feet; 1912, 75,876 acre feet; 1913, 47,906 acre feet. Average 48,480 acre feet.

591 This average is probably too large. On reviewing water commissioners' reports find that, especially in years 1910 to 1913, I have estimated possible storages when water commissioners were reporting shortages in Districts 8, 2 and 1. Also, I have not allowed for evaporation and other losses. My opinion therefore is that 45,000 acre feet represents the greatest possible average storage. This, however, is not the average possible delivery.

Exhibit 32 is a tabulation of the result of the operation of Lake Cheesman upon an assumed annual draft of 40,000 acre feet, according to my estimates of possible storage, covering the years 1902 to 1913 inclusive, again excepting the year 1909, in which year, because of large flow, the reservoir certainly could have been filled.

Exhibit 32 explained.

The figures for possible storage there given are from previous Exhibit 30. Withdrawals from reservoir, May to October inclusive, according to percentages determined by Mr. Comstock from an examination of diversion of ditches in District 8, to-wit: May 15%, June 25%, July 25%, August 20%, September 10%, October 5%.

Exhibit 32 further explained.

Exhibit 29, 30, 31 and 32 admited over objection and exception.

As to value of water rights:—Stored water particularly valuable, because it can be used at user's pleasure and to accomplish the greatest good, and at periods when there would be a shortage in the river for direct flow; available at those times of the year when ordinarily the river is low. The more valuable crops, generally speaking, require water late in the season. With storage water the user can raise any kind of crops; not limited in that respect by the stream flow. He can also use stored water when direct appropriation fails him. Stored water has its greatest value as a supplemental supply; that is, a supply supplementing a direct flow right. In determining the value of water, we must determine the period of the irrigation season when it is to be used. An acre foot of water used in June is not as valuable as an acre foot of water used in August. The supply being great in June and short in August, the price is higher in the latter month.

I have for a number of years been considering the value of water in Colorado. In my investigation and reports on proposed irrigatin projects I have had to assume some values for determining feasibility. In that way I have an idea of the value of water. Have taken into consideration character and amount of crops, value of lands, revenue to be derived from farming operations, sell-
592 ing price of land with water, selling price of water alone, and especially the price which the user can afford to pay and make his farming business profitable.

Value of water is not the difference between value of raw land and value of land and water united, with the land cultivated, fenced and improved. Must consider value of improvements, time that

has been spent by the farmer in bringing it to a profitable basis; also that some inducement must be offered to the farmer to go out and take up raw land, spend several years thereon, etc. In considering feasibility of projects, always tried to consider ultimate user of land, and felt it necessary to offer farmer inducement other than bare living. Value of water limited by price which farmer can afford to pay—that is maximum.

Investigation in Poudre Valley resulted in conclusion that average production or gross yield was $50 per acre. Cost to produce about $25 per acre. Considering taxes and the like and allowing ten per cent on the investment, land producing such crops would be worth $200 per acre. Cost of putting land into condition as follows: Cost of raw land $40 per acre; fencing $15 per acre; improvements $40 per acre; water rights $75 per acre, profit $25 per acre, total $200. The profit of $25 per acre is the inducement to the farmer for his time and work and interest during construction. Think value of farm should be divided equally into three elements, land, water and improvements (including farmer's time); this would produce about $70 for each element per acre.

Assuming land with water in the vicinity of Denver to be worth $200 an acre, that would contemplate an ample water supply, and would require as a minimum two acre feet per acre, and probably two and a half acre feet per acre to accomplish the greatest good. Under existing canals in this vicinity which have a good right the use is, I think, generally three acre feet per acre. Value of water by months: May and June, $12 to $15 per acre foot, on the basis of value of the Highline rights, but as this supply even in those months is irregular, say $25 per acre foot. As the season advances the value increases. In August the value would be $50 per acre foot, but if delivered throughout the irrigation season $40 per acre foot, which I have taken as the value of water in Lake Cheesman delivered in that way. If, however, the water was all delivered in the latter part of July, August and September, when the water was of more value, I should place the value per acre foot at $50. Therefore, as a supplemental supply Lake Cheesman water in my judgment would be worth $50 per acre foot; as an entire supply from $35 to $40 per acre foot, measured at the headgate of the canal. 40,000 acre
593 feet at $50 each makes Lake Cheesman as an entity, including structures, worth $2,000,000.

Direct flow rights differ in value and in characteristics from stored waters. Stored water may be used at any time. Direct flow rights must be used when the water is in the river. If, not, then use is passed on to the next user. The character of crops may be changed by the necessity of using water during certain periods of the year and not having enough water at other periods, when other crops might be grown. Stored water may be carried over. If one has a surplus in one year he may carry it over into another, which of course cannot be done with direct flow rights. Direct flow rights if there is probability of shortage later in the season, are sometimes drawn upon to a greater extent than otherwise they would be. Stored water, when the alfalfa, for instance, is being harvested, can be held

until later and until it is needed. In such a case the direct flow rights get past down the river and go to other people and the owner would get no benefit. There is such a wide difference in the value of the two that the value of the two is very different. It would give incorrect results to estimate the value of direct flow rights on the basis of acre feet. You have not the same latitude of use in direct flow rights as in reservoir rights; your possibilities are limited; you must use it when it is flowing in the stream; you cannot save it for other periods of the year or for other years. You cannot figure a direct flow in terms of acre feet, any more than you could figure the value of an acre foot of water in storage on the basis of the value of a direct flow; the two things are so different.

As to the value of Platte Canon rights and Marston Lake, I considered these in a group, as Mr. Anderson did. This group covered items 1, 2, 3, 4, 15, 16, 17, 13, 14 and 21 of Exhibit C. Mr. Anderson did not deduct enough from Platte Canon ditch yield to cover Hugens and Shellabarger rights. For these I have deducted 2.86 cubic feet per second, leaving a net for the Platte Canon ditch of 50 cubic feet per second, which I have valued at $4,000 per second foot. I think it is worth that much per second foot. This makes for the Platte Canon ditch $200,000.

For the Platte Canon filter beds, I have valued the average delivery of 10 cubic feet per second at $1,000 each, making $10,000, for the summer flow, and at the rate of $2,825 per second foot for the winter flow, making $28,252, or a total of $38,252 for the summer and winter flow of the Platte Canon galleries.

As to the winter flow of the Platte Canon ditch, for five months that would amount to 14,771 acre feet, which might be
594 stored in Marston lake. The Bear creek rights furnish 6,840 acre feet. These two combined would fill Marston Lake, which has a capacity of 19,794.7 acre feet, which at $40 per acre foot makes $791,788. Seepage and other loss from Marston Lake somewhat greater than from Cheesman. Marston Lake water is somewhat less available than that at Cheesman, and therefore somewhat less valuable.

Total value, therefore, for group 1, $1,030,252, which is $123,534 less than the structure value ($1,153,886) testified to by Mr. Anderson.

As to value of group 2, being items 5 and 6 of Schedule B of Exhibit C, I did not place a separate value on item 5. On item 6 I have placed a value of $1,500 per cubic foot per second. In this connection I have considered what would happen if the right were converted to irrigation use, and also the necessity of changing the point of diversion. At $1,500 per second foot, the total value of this right is $15,000 for the summer flow, and $11,000 for the winter flow, making a total of $26,000; structure value as given by Mr. Anderson $72,980, or about $47,000 in excess of value of water and structures combined as fixed by me.

Item No. 7, Cherry Creek rights. Assumed 8 cubic feet per second can be delivered. Have assigned a value equal to that of Highline ditch water, to-wit, $1,250 per cubic foot, making a total of

$10,000. Winter flow not available; but considered as a continuous flow right to irrigate a certain number of acres, I have assigned it a value of $20,000. The structures existing and necessary to utilize this right, as stated by Mr. Anderson equal to value of $60,000, exceeding my valuation of water rights and structures combined by $40,000.

Item 8, Platte Canal filter galleries. As heretofore stated, I value this right at $38,252, winter and summer flow included.

Items 9, 10 and 11, I accept Mr. Anderson's figures, as follows: Item 9, $24,750; item 10, $30,000; item 11, $1,250.

Summary of valuations: Lake Cheesman, $1,600,000 to $2,000,000, depending on whether water was used for entire irrigation season or as supplemental supply; deducting value of physical property as given by Anderson leaves, in the first case a water value of 573,223 for irrigation purposes, and in the second case a water value of $173,223.

Group 1, $123,866 less than the value of physical property.

Items 5 and 6, $47,000 less than physical property.

Cherry Creek rights, $40,000 less than physical property.

Filter galleries, $27,148 less than physical property.

Or a total of $208,034 less for those items than the values placed upon the physical property.

595 This seems strange. It may be accounted for by an overvaluation of the physical property, or by the fact that such structures as these are not the kind of structures built for irrigation purposes. They are entirely too expensive, and aside from being expensive, they have no added value over the less expensive structures usually built.

Deducting said amount of $208,034 from the excess water right value for Lake Cheesman, on a basis of a total value therefor of $2,000,000, and adding items 9, 10 and 11, gives a net value of water rights of $421,189; or, omitting the negative quantities, a net value of $629,223.

As to possible market for rights: Am familiar with acreage under Highline, under Henrylyn system, and under Denver Reservoir Irrigation Company's system. There is sufficient acreage here to absorb the storage capacity of Lake Cheesman as a supplemental supply. Under the Highline the water would have to be carried through probably 60 miles of ditch; under the Henrylyn through probably 75 miles. Under the Highline the loss in carriage would be at least one-third; under the Henry-lyn about the same. These are averages. From Cheesman to head of Highline ditch loss in stream 5%; from Cheesman to head of Henry-lyn loss in stream 10%. As to stream bed losses, these are estimates. There is not much available data. My answers are based largely on present prevailing custom of deduction for losses in transit. The loss in the stream is larger after it leaves the mountains.

Referring to testimony of Mr. Edwards regarding Larimer and Weld Canal. Total acreage served by that canal is about 40,000 acres. The average amount of water furnished is about 62,000 acre feet.

The majority of the reservoirs in this state are stream-bed reservoirs. Stream-bed reservoirs are able to store the maximum floods, while plains reservoirs are limited by the capacity of the intake ditch. Stream-bed reservoirs require more extensive spill-ways and more careful attention. Inflow and outflow records must be kept. The operation is more complicated. Silt accumulates in a stream-bed reservoir.

Exhibits 33 and 34, tables of supplied and unsupplied demands for water in District No. 2 for the years 1912 and 1913, explained. Made up from reports of water commissioners and from hydrographic data in State Engineer's office. These tables contain matters considered by me in making my estimate of demand on the canon.

Exhibit 33 further explained. "However, in the treatment, I have not considered the unsupplied demand in District No. 1 as demanding water at the canon, though, as a matter of fact, it would at times so demand water and be entitled to it."

596 Exhibit 33 further explained. Letter "A" refers to foot note on last page. Letter "B" likewise refers to footnote at bottom of last page. The Burlington, as a general proposition, demands from 300 to 400 cubic feet per second. The demand of the Highline is practically its capacity. That is the standing request, that the Highline be filled to its full capacity whenever the water is available in the river. In November return seepage would supply ditch requirements in District No. 2, and therefore there would be no demand on the canon from that.

Exhibit 34 explained. In April inflow in 8 would supply ditches in 2, therefore no demand on canon from 2.

Exhibit 35 explained. It is from weekly reports of water commissioners. From consideration of these tables I arrived at a conclusion of amount really necessary at canon in order to supply the demands, the average demand for the month, not for this year alone but as applicable to the years in general. I have considered more particularly the condition of the two critical ditches in the two districts, namely, the Highline and the Burlington. They are both very large, both have comparatively late decrees, and by studying them, as to whether they were or were not drawing water, or whether the water that they were drawing was insufficient or not, we can get a very clear conception, I think, of whether or not there was a surplus in the river at the time. Certainly, if neither one of these ditches was drawing during a period when they needed water, then no water could be stored in Lake Cheesman, and with that conception of the case I have constructed this table.

Now at those times when the Highline was drawing an insufficient amount of water, and where it was not drawing any water at all, we may safely assume that the flow in the stream was insufficient to permit Cheesman to store at all.

Exhibit 35, last sheet, shows final conclusions as to demand on canon each month.

Exhibits 33, 34 and 35 admitted over objection and exception.

As to testimony of Mr. Wiland. The Colorado Canal is ordinarily

referred to as the Bob Creek Canal. Its direct flow rights not very good. Twin Lakes reservoir supplemental supply. Also other supplemental supplies. As to Colorado, or Bob Creek, Canal, I made some investigation of values of water rights. Prices investigated covered both direct flow and reservoir rights under that system. Investigation made in July, 1913. Prices: for ditch rights $30 per acre; for Twin Lakes reservoir rights $20 per acre, and Lake Meredith reservoir rights $10 per acre. Average diversion about one and one-half acre feet per acre per annum.

597 Also familiar with the Bessemer canal mentioned by Mr. Weiland, and value of water under it. Current selling price of water rights $110. Amount diverted about 3½ feet per acre per annum, indicating a value per acre foot of $32. The price for the water is about $110 per acre, and little can be obtained at that price. Mr. Weiland's allowance of $7.50 per acre for the raw land is low for land in that vicinity, where there is any hope or probability of getting water. His allowance of $20 an acre for improvements is also too small.

Cross-examination:

I was not subpœnaed in this case. I have spent considerable time and labor in connection herewith, but not as much as I should like. Employed by defendants for that purpose. Not testifying in capacity as State Engineer. Conclusions here announced not those of State Engineer. They do not necessarily represent what are or would be the conclusions of myself as State Engineer. I reserve the right to arrive at different conclusions in that capacity. Am here using stationery of the State because they were the only blanks I had handy.

State divided into five water divisions; each division into a number of water districts. In each water district there is a commissioner; in each division a division engineer, with the State engineer at the summit of the structure.

Districts 23, 8, 2 and 1 are in Water Division No. 1, or the South Platte division, of which Filmore Cogswell is division engineer, and has been for six years.

Division engineers appointed by Governor; water commissioners by Governor, on recommendation of board of county commissioners. Water commissioner's duties confined to his district. Division engineer's duties relate to disputes between districts. He may also determine disputes between users in one district, and reconsider determinations of water commissioners. In all cases there is a right of final appeal to State Engineer. In that respect State Engineer occupies a judicial, or quasi judicial, office.

Matters which I have here testified about might come before me as State Engineer. As an illustration, I as private water user under City ditch called attention of City to the fact that interpretation of their decree was incorrect. City applied to me as State Engineer to change interpretation. As State Engineer, I refused, because interpretation had been going on for many years. That illustrates the difference between the individual and the official.

The conclusions I have arrived at in this case will not influence me when these questions come before me as State Engineer. I see no impropriety in my making these determinations and
598 testifying to them in this case, although I am State Engineer. This is so because seven years ago, at the time of the former appraisement, I was employed by the City to make similar determinations, which I then made and reported. The accuracy of my report and determinations was questioned by a good many people. I felt in this case that, because of my former connection with the matter, it was no more than right for me to continue. I had no scruples about it, but felt I had a duty to a previous client to perform. My present determinations will not control my future official action. When in future the right of Lake Cheesman to store comes before me as State Engineer the matter will be determined upon actual conditions existing at the time.

The quantity storable at Cheesman varies greatly from day to day, from month to month, and from year to year. These variations are caused by sudden floods and rises in the river and its tributaries. Sometimes last for a single day, or for two days, or for only three days in succession. Also demands of individual ditches are exceedingly variable dependent upon condition of precipitation, etc.

I feel that I can approach the decision of such questions as State Engineer with a perfectly open mind, notwithstanding the determinations made in this case; also that there is no impropriety whatever in the State Engineer doing what I have done in this case.

Began preparation in this case after hearing testimony of Anderson and Comstock. Prior thereto had made no investigation with respect to the matters which my exhibits set forth. Upon consideration of their testimony and exhibits, was impressed at statement of Mr. Comstock that average deliverable amount in Cheesman was 70,000 acre feet. In 1907 and 1908 I had found it much less. I therefore investigated Mr. Comstock's figures to see how we differed. My effort was to find the error in his process of reasoning. I approached the consideration of Mr. Anderson's testimony and his tables in the same way. I did not make any entirely independent investigation of my own. In arriving at my results I used Comstock's corrected stream flow table from 1908 to 1913. Exhibit 30 sets forth the results thus arrived at by me. I did not use any of Mr. Anderson's figures. In so far as I made any original investigation, the conclusions therefrom are set forth in Exhibit 30.

My former investigation in 1907 was in connection with the first appraised of the Water Company's plant. Was then employed by City to prepare data and present considerations and evidence
599 to the board. Mr. Fellows was also with me in the work and it was done under the name of Field Fellows and Hinderlider.

The data presented to the old board was in the form of statements or reports in writing, signed by myself and Mr. Fellows. We filed three such statements or reports. (Objected to. Objection overruled. Exception.) Also appeared in person before the board to assist Mr. Thomas, the attorney. The city was represented by

Governor Thomas, and I was present at the time arguments were made before the board on the question of water rights. Notwithstanding our efforts and evidence, that board valued the water rights, exclusive of structures, in excess of two million eight hundred thousand dollars. (Objected to. Objection overruled. Exception.) They valued the Lake Cheesman water right, exclusive of structures, at one million five hundred thousand dollars. (Objected to. Objection overruled. Exception.) The old board of appraisers lacked experience in irrigation matters. The men constituting that board were of high standing in the profession, and of very large experience in matters pertaining to water works and water supply for domestic purposes.

In my evidence submitted to the old board of appraisers, the estimated yield of Cheesman was something less than 40,000 acre feet; somewhat less than the estimate which I have here presented. That possibly was true in respect to the other water rights. The water rights then examined were the same as those here involved. The unit prices or values which I then applied were also less than those to which I have now testified.

As hereinbefore stated, the reports which I submitted to the former board of appraisers were criticised in a professional way. That occurred at a meeting of the American Society of Civil Engineers. The criticism was that the appraisement was entirely too low. I felt that I was at a disadvantage at that time because I had not been given sufficient time to prepare.

Mr. George Anderson was also a witness before the board of appraisers. I have criticised the testimony and tables which he has submitted in this case.

Since submitting my report to the old board of appraisers I have really made no further investigation of the matters involved except in this particular hearing. For this hearing I have spent perhaps four days in the court room before I went on the stand; probably fifteen or eighteen days outside of office hours. A good many of these were nights. If I had had more time it would have been of benefit. With more time I think I would have been able to get down to allowances of quantities below my present estimate.

600 I am quite positive that lack of time has not led me into the error of assigning too low quantities. Not all of the time spent by me in preparation was at night. There were Saturday afternoons and Sundays. At the rate I work I count Saturday afternoon a day. I am a rapid worker and I believe I accomplish as much in half a day as an ordinary engineer would in a full day.

The criticism of my former report may have entered in a small way into my determination to testify in this case, for the purpose of justifying my former conclusions. Did not feel called upon to justify my former report, but felt that I had a duty to an old client to perform.

In my present investigation I made no use at all of data which I had collected and the conclusions which I had drawn therefrom in my former report. I made no reference at all to my former report; did not review it or look at it, and made no use of data which I

had then gathered, except so far as I had independent recollection thereof; and nevertheless made all my preparations for this case in a period of about fifteen or eighteen days.

As to estimated possible storage at Cheesman, the eliminations which I have made from the estimates of Anderson and Comstock are based upon my investigation of the water commissioners' reports. In constructing my Exhibit 30 I used the weekly reports of the water commissioners almost exclusively. After constructing it I examined their bi-weekly reports. The bi-weekly reports are more complete. They tend to show that my allowance as to the storable amount in Cheesman was probably excessive. When I made eliminations from the estimates of Anderson and Comstock, I did so because in my judgment, based upon my construction of the water commissioners' reports, such storages could not have been made at those times.

As to Anderson's Exhibit A-32, I gave specific consideration only to the years 1909 and 1913. My present judgment is that in testifying on direct examination I said the same thing in respect to the various years and the various months of each year relative to Anderson's Exhibit A-32 and Comstock's Exhibit A-54.

In commenting on Anderson's Exhibit A-32 I stated, as to the year 1910, that there could not have been any storage for part of the months of April, and for all of the months of May, June, July, August, September and October, and that for the year 40,000 acre feet only could have been stored, whereas in my Exhibit 30 I have estimated a possible storage in April, May, July and August, and a total possible storage for that year of 47,408 acre feet.

601 I have not taken the water commissioners' reports at their face value. I did not do so even as to the weekly reports of the water commissioners, upon which exhibit 30 is based.

As to the year 1911, I did not take into consideration the fact that the Antero reservoir stored approximately 11,000 acre feet. The priority of that reservoir is subsequent to Lake Cheesman.

My estimate of storage at Cheesman in 1911 is 9,000 acre feet only, about 1,170 acre feet less than the quantity of actual storage at Antero. The quantity stored at Antero did not appear in the recorded stream flow at Cheesman. If that storage at Antero occurred at times when storage was proper, then it should be added to my estimate of possible storage at Lake Cheesman, and the storable quantity at Cheesman for 1911 would be at least 20,000 acre feet. That is true unless my estimate of demand on the canon for the winter months is too low.

Anderson's Exhibit A-32, 1912. In criticising the same I finally stated that only 75,000 acre feet should be deducted from Anderson's estimate for 1912. That would leave 79,286 acre feet as possible storage. That is more than enough to fill the reservoir. Therefore for that particular year there is no deduction to be made from Anderson's final estimate. Therefore I was mistaken when I said that Mr. Anderson made an overestimate of 5% for that year.

In constructing my Exhibit 30 I used only the weekly reports of the water commissioners. In criticising the testimony of Anderson

and Comstock and their Exhibits A-32 and A-54 I had also the water commissioners' bi-weekly reports. In my first comments on Anderson's Exhibit A-32 for 1913, I stated that the total storage for that year could not be more than 34,592 acre feet. From a later examination of that year, in connection with said exhibit, I stated that the storage which could have been made was 33,668 acre feet. In my own Exhibit 30 I estimated for 1913 a possible storage of 47,906 acre feet.

As to 1914, there is no doubt at all that Lake Cheesman could have been filled to its capacity. I did not consider the year 1914 at all. That year has been a year of large flow, and the direct diversions of ditches have been unusually large. If I had included it, it might have increased my estimate of the average demand on the canon. Whether such increase would have occurred, or whether it would have offset the increase in average efficiency of Lake Cheesman, caused by including the year 1914 as a year of full reservoir, I do not know.

As to my estimate of demand on canon, I have not arrived at it by averaging the demands for any particular years. I have not simply put down the figures as they appeared for each year
602 and averaged them, as a matter of arithmetic. I have assumed what in my judgment would be an average demand. But in criticising the tables of Anderson and Comstock I was dealing with the actual demands as they existed each year.

As to Anderson's Exhibit A-32 and the percentages of error as determined by me. In 1909 there was no excess, and therefore no percentage. For 1910 the excess as compared with my Exhibit 30 and the consequent percentage is less than 20%. Exhibit 30 represents my own conclusions. That is quite distinct from the criticism I made of Anderson's report. I offered Exhibit 30 as my judgment of what could have been stored in the years covered thereby, although the estimate is probably excessive.

Comparing my Exhibit 30 with Anderson's A-32 and A-31, his estimate for 1910 exceeds mine by about 5.2%. In criticising Anderson's estimate, my method was to deduct from those months where, according to my Exhibit 30, I thought he had overestimated, but not to add to those months where I thought he had underestimated. I was trying to ascertain Anderson's percentages of error, based upon a consideration of the years 1909 to 1913, and apply that in reduction of his estimate of former years. I consider the method I employed correct for that purpose.

1911, in which I found Anderson's percentage of excess to be 70%, was the year in which the smallest quantity of storage was estimated. Consequently, while the percentage of excess was high, the effect on the total quantity for the period would be exceedingly small.

In my Exhibit 30, year 1912, month August, the total storage should be increased by 1,000 acre feet, making my total estimate for that year 76,876. On those figures, Anderson's is in excess for that year 5%. Moreover, as stated this morning, if I had deducted from Mr. Anderson's estimate only what I now think should be

deducted, there would remain more than enough to fill the reservoir, so that for what year there was no percentage of excess.

For 1913, comparing Anderson's estimates, Exhibits A-31 and A-32, with my Exhibit 30, his excess is 39.4%, instead of 50%.

Comparing the aggregate of the totals of my estimate and Anderson's for the years 1909 to 1913, the excess of his estimate over mine is 17%. If 1914 included, that would be further reduced.

My determination of possible storage for 1901 of 50,000 acre feet was based on fact that stream flows that year were about normal, and that was about the average storable quantity. There
603 was an absence of records of demand for that year. Also the records of stream flows were not complete.

Field's Exhibit 30 compared with Anderson's Exhibits A-31 and A-32, year by year. So compared, the excess of Anderson over Field is 9½%, instead of 25%, for the years 1902 to 1908. If the storage actually made in Lake Cheesman in June and July, 1904, as shown by Field's Exhibits 30 and 31, were added to the total storage as estimated by Field for the years 1902 to 1908, there would be a difference in the grand total between Anderson and Field of only 7,596 acre feet. I rejected that actual storage because on my estimate of that demand on the canon of 1,000 cubic feet per second no storage could have been made. My estimate is of the average demand. It may not hold good for each and every day. One must consider all of the surrounding conditions all of the time in determining possible storage, and cannot proceed on glittering generalities about anything of that sort. But here we are attempting to forecast the future by what has occurred in the past.

In Exhibit 30 I have made no allowances for evaporation, but it appears that Anderson did not deduct evaporation from the figures which have been here used for comparison.

Taking the total storage for the years 1900 to 1914 as estimated by Anderson in his Exhibit A-31 and as estimated by me in my testimony and in Exhibit 30, Anderson's average annual storage is 57,108 acre feet, and mine 50,638, an excess of Anderson's figures over mine of 12.8%. Nevertheless, I still think it was fair to say that there should be deducted 25% from the average storage given by Anderson in his Exhibit A-31.

1914 followed the somewhat dry year of 1913, and the diversions of water were somewhat greater on that account.

The determinations in my Exhibit 30 were made with a view to ascertaining the facts concerning the storable water for Lake Cheesman. Anderson's determinations, as shown by his Exhibits A-31 and A-32, were made with that same end in view. Nevertheless, I do not think it fair to compare the results shown by my exhibit with those shown in his.

Cheesman dam not completed until some time in 1904. Prior to that time storage limited by stage of construction.

1902 was an exceedingly dry year and a year of low stream flow. After Cheesman was completed and once filled subsequent actual storage was limited by stage of water in the lake.

As to the actual storage made in June and July, 1904, I do not

know whether there were any complaints by other users of water. Apparently Cheesman was permitted to retain the water so stored.

604 My estimate does not pretend to show actual facts as they existed in the past, but only what may be expected in the future, with demands as they are at present and with stream flows as they have existed in the past.

There is no storage right on the river earlier than Cheesman except Barr Lake, which has a decree for 11,000 acre feet, plus enough water to make up for seepage and evaporation. The demand which I speak of is a demand for direct flow rights, except as to the Barr Lake storage right Generally speaking, any increase in demand in the future must be an increase in existing direct flow rights. Any increase of such rights by court decree is so rare as to be negligible.

I cannot recall any specific instance where storage for use in the same irrigation season has been permitted. The Seven Lakes' decision of the Supreme Court is practically a dead letter. This can only be done by fooling the water officials.

The direct diversion ditches are now more insistant upon their rights, and this has a tendency to increase their diversions at the expense of subsequent appropriators. Increased irrigated area under the older ditches is principally caused by the more economic handling of water and higher duty of water.

If it be true that Mr. Anderson during the winter months stored at Lake Cheesman, and included in his estimate of storage all of the water flowing in the South Fork, and deducted from his estimated yield of the Platte Canon ditch whatever shortages therein were caused thereby, then my criticism to the effect that Mr. Anderson had not given sufficient consideration to the requirements of the Platte Canon ditch in the winter time was not well founded, and to make a direct comparison between his estimates and mine the additional storage at Lake Cheesman thus resulting must be taken into consideration.

In 1912 storage could have been made to the full capacity of the reservoir, although my Exhibit 30 states 76,876 acre feet. Taking the figures stated in Exhibit 30, with 1912 corrected as aforesaid, adding the year 1900 as a year of full reservoir, 1901 with 50,000 acre feet and 1914 as a year of full reservoir; adding also the quantities which Mr. Anderson estimated as stored at Lake Cheesman and deducted from the Platte Canon ditch, and comparing the total thus arrived at with Anderson's total, as shown by his exhibits, for the same period, Field's figures show a reduction from Anderson's figures of 9.4%. Adding the actual storages really made in June and July, 1904, but which were eliminated by Field in his estimate, and Field's figures show a reduction from Anderson's of 7.1%.

As to Comstock's testimony and his Exhibit A-54, my detailed criticism of this covered only the years 1909 to 1913. As to 1910,

605 in criticising Comstock I said 43,480 acre feet could have been stored; in criticising Anderson 40,000 acre feet. I gave my own opinion of possible storage in my Exhibit 30.

The analysis of Comstock and Anderson was a criticism without much of an attempt to arrive at actual figures. Nevertheless, thereby I produced a percentage which I applied to their estimates for previous years and to their average estimates. In my own Exhibit 30 I showed for 1910 a possible storage of 47,408 acre feet.

As to 1911, in criticising Comstock I said there could have been stored 13,000 acre feet, in criticising Anderson 9,000 acre feet, and in my own Exhibit 30, 9,830 acre feet.

In getting at actual facts of the past, in the absence of all of the information that might be obtained if conditions were examined at the time, you cannot get at the actual facts within narrow limits. In criticising Anderson and Comstock I applied the things set forth in the water commissioners' reports to their tables. In my Exhibit 30 I arrived at what I considered to be the facts in respect to the matter for each of these years. But by their methods they did not arrive at total quantities which exceeded my own by any such percentage as 25%. In my Exhibit 30 I allowed storage on certain days when they did not, and on certain other days I allowed more storage than they did on the same days. Nevertheless, I do not think my Exhibit 30 should be used in analyzing my criticism of the estimates of Anderson and Comstock. I did not consider my Exhibit 30 at all in my criticism of their reports.

In my criticism of their testimony and exhibits I made eliminations when according to my assumptions eliminations should be made, but no additions when according to my assumptions additions should be made.

As to the year 1912, in criticising Anderson's estimates I finally stated that the reservoir could have been filled for that year; yet my Exhibit 30 states that there could have been stored in that year only 76,876 acre feet. The fact is that the reservoir could have been filled, and that is the fact in reference to my Exhibit 30, namely, that the reservoir could have been filled in 1912. I have already so testified. According to my assumptions and my analysis, the reservoir could in the year 1912 have been filled to its capacity, to-wit, 79,054 acre feet. That is the fact about it according to my exhibit and my understanding.

As to 1913, in criticising Comstock's figures I stated that the storable quantity should be 46,860 acre feet; in criticising Anderson's that it should be 33,688 acre feet; by my own Exhibit 30 I showed that 47,906 acre feet could have been stored in that year.

606 After thus reviewing Comstock's estimates for 1909 to 1913, I stated on direct examination that a reduction of 25% should be applied to all of the preceding years included in his estimate, from 1900 to 1908 inclusive, and I applied that percentage to his average storable quantity for the years 1900 to 1914, although I did not include the year 1914 in arriving at my percentage of reduction. In making my determinations I referred to the water commissioners' reports for my guide as to the quantity of water needed. At periods when there were no water commissioners' reports I deducted from Mr. Comstock's figures on the basis of an estimated demand. I took the water commissioners' reports at their face value. I dealt with

the exhibits of Mr. Anderson and Mr. Comstock in the same manner. Thereby, in considering Mr. Comstock's exhibit I determined that the average annual storage would be 47,234 acre feet; in considering Mr. Anderson's 43,750, and in my own Exhibit 30 48,380. I arrived at this in the case of Comstock by deducting from his estimate and the average of his estimates 25%. If I had included 1909 as a year of full reservoir, which it was, the percentage would have been 20%. I took the average of the percentages of excess ascertained by my examination of the years 1910 to 1913 and applied that as a percentage of reduction to all of Comstock's estimates for all of the years included therein. I consider this a fair method, notwithstanding the fact that the quantities involved in the various years vary greatly, as, for instance, in 1911, when the quantity was very small. I do not recognize that the only correct method is to compare total quantities by his estimate and by mine, and thus ascertain a percentage. I endeavored to ascertain a percentage of error, and I consider my method correct, although the percentages of excess so ascertained vary greatly from year to year.

As to the year 1912, I have admitted that in my Exhibit 30 the proper figure should be 79,064 acre feet. I assumed Comstock's estimate for 1912 to be 10% in excess, although as a matter of fact both he and I made in that year exactly the same estimate, to-wit, a full reservoir. That percentage went into my average percentage. If 1912 be dealt with as a full year, the average percentage of excess in Comstock's estimate would be 18 instead of 25%. Using 20 instead of 25% to apply to Comstock's average results in a quantity for the average annual storage of 50,383 acre feet. I applied this percentage of reduction even in those years when both Comstock and myself estimated a full reservoir.

The reservoir could have been filled in 1900, 1909 and 1912; also in 1914.

607 I consider it fair to apply a percentage of reduction so ascertained, even to the years when beyond question there could have been storage to the full capacity of the reservoir.

As to Comstock's Exhibit A-52, table 1, the Epperson, or Green Valley, ditch, omitted from that table, is a relatively small ditch and its decreed priority small in quantity. Its intake is near Overland Park and below the intakes of the Brown and Petersburg ditches, which I eliminated from consideration because they receive their supply from seepage and inflow. The Epperson, or Green Valley, should be eliminated for the same reason. Its omission from Comstock's table would in no manner affect the result.

Exhibit A-52, table 1, Platte Water Company's decree. The decree has always been construed as stated in Mr. Comstock's exhibit. In my capacity as State Engineer I now enforce it according to that interpretation, and allowances are made to the ditch upon that basis. In 1897, when I was formerly State Engineer, I was requested to change the construction of the decree, but I refused to do so. No suit has ever been brought to change that determination of the water officials. The present capacity of the ditch is 85 second feet. The present interpretation of the decree, as stated in Mr. Comstock's ex-

hibit, has been in vogue for almost thirty years. As State Engineer, I would not now change it, except in obedience to a court order. The ditch has never diverted in any year since 1889 at a greater average rate than 51 second feet. I would not attempt to determine whether that constitutes abandonment of any greater quantity mentioned in the decree. To prove abandonment is a very complicated and difficult matter.

As to Exhibit A-52, table 2, relating to Platte Water Company's ditch (City ditch), my criticism was that it did not give proper weight to unsatisfied demands. The city itself uses water from that ditch for city purposes, to irrigate some of the parks, etc. As a user of water under the ditch, I am party to pending litigation with the city relative to water rights thereunder. So far as I am concerned, the suit does not involve a dispute as to distribution of water from the ditch between the city and myself. It may as to other litigants. The first decrees only of the City ditch (30 cubic feet per second) is equivalent to one second foot for each 67 acres of the total acreage (2,000 acres) under the ditch. I believe the first decreed priority of the City ditch has never been shut off. It is the very first decree on the river. This ditch diverts at an average of 6.9 acre feet per acre per annum. That includes what is diverted for city uses. The dispute between the city and the farmers is, I presume, based on the claim by the farmers
608 that the city is claiming and using for city purposes too much of the total appropriation. I do not know how much the city uses. I do not know whether the city uses as much water as would be necessary to irrigate a thousand acres.

As to Exhibit A-52, table 3, relating to the Nevada ditch, my first criticism of this was that it did not give due consideration or effect to unsatisfied desires or demands. The diversion by that ditch in 1913 (20,130 acre feet) for the number of acres irrigated (1,900 acres) amounted to 11 acre feet per acre per annum. I consider that an excessive diversion of water. In 1911, a year of low flow, the diversion was 6.8 acre feet per acre per annum. I would consider that under ordinary conditions as an excessive diversion. The average diversion for the years covered by the table amounts to more than 5 acre feet per acre per annum. I consider that to be a pretty good supply. Nevertheless, I hardly think my criticism unjustifiable, to the effect that the table did not give due weight to unsatisfied demands. Old ditches having old decrees take water in large quantities. 20,000 acre feet per annum is an excessive demand and an excessive diversion for 2,000 acres of land. Nevertheless, inasmuch as that rate of diversion does not exceed the decreed quantity, I as State Engineer, even though I might consider that the amount they were using was excessive, would not interfere with the diversion unless I found that they were actually wasting water. However, if I found that they were wasting it, even though the rate of diversion did not equal or exceed the quantity mentioned in the decree, I personally would prevent it. It is not very often done, but it should be done.

The assumption that I made in determining the demand upon the canon which limited the right of Cheesman to store, I assumed that all of the water diverted by the various ditches was actually needed,

and that those actual diversions represented the actual needs, except as to unsatisfied demand.

In constructing my Exhibit 30 I took the estimates prepared by Mr. Comstock, and shown by his Exhibit A-52, as the average diversions of these ditches as the quantities needed to supply prior *prior* rights, except in the case of the Highline ditch, in which case I added something for unsatisfied demand. I assumed that these large diversions made were no more than the ditches needed, because they were actually made and permitted to be made. As to ditches in District No. 2, I did not employ Mr. Comstock's figures but made my own estimates.

As to District No. 2, I determined the total demands of the ditches as shown by the water commissioners' reports, deducted from it the stream flow at Denver at a particular day, and the balance was the unsatisfied demand which must be supplied by water flowing
609 from District 8 into District 2. The unsatisfied demands of those ditches usually represented the difference between what they were receiving and the amounts specified in their respective decrees. That was the deficiency which I made use of in my computations, and I gave no consideration at all to the question as to whether those ditches, or any of them, could at that time actually have diverted or actually have applied to a beneficial use all of that alleged deficiency.

I do not in any of my computations made for the purpose of this case allow to the Nevada ditch more than 10,817 acre feet per annum. Exhibit A-52, table 4, Petersburg ditch. If in 1912, according to the water commissioner's figures, that ditch diverted 9½ acre feet per acre, that may be an excessive diversion. That is possibly more than the ditch ought to require under any circumstances. If that ditch was diverting 9 acre feet per acre per annum, I as State Engineer would permit it if they were not wasting the water. What I mean by wasting it is running it back into the river or allowing it to accumulate on roads or in sinks, but not if they applied it to the land.

In accepting the water commissioners' reports as to the demands of ditches, I have made no investigation to determine what they would mean in terms of acre feet per acre. I took those demands just as stated in the water commissioners' reports, although I made reductions in the quantities in my final estimates.

Exhibit A-52, table 5, Platte Valley ditch. In criticising Mr. Comstock, and in my own computations, I used as the requirements of this ditch 1639 acre feet per annum. 7.5 acre feet per acre irrigated, the diversion of this ditch for 1909 according to the water commissioner's report, seems large. When you are endeavoring to find how much water in quantity a certain amount of land ought to have in any one year, it is proper to express it in acre feet. 7 to 7½ acre *per* feet per acre per annum is not an unreasonable quantity if the farms are small, or if they are gardens, and things of that sort.

Leaving District 23 out of consideration, my judgment is that in the other districts here in Northern Colorado the use of water is about the same. But in considering a small ditch, like the Platte Valley,

having a small acreage under it, it is necessary to know the character of the land, whether gravelly, etc., also the soil and subsoil, the crops raised, and how the land is divided into different holdings. In the absence of differences in these respects the necessary use of water throughout Northern Colorado is approximately the same.

610 As to the Platte Valley ditch, if the water commissioner's reports for 1912 gave an acreage under this ditch indicating a diversion by the ditch of 17.39 acre feet per acre, and if the acreage given be correct, that is an excessive use. The water commissioner's statements of acreage, especially of small tracts, is not as reliable as the balance of his reports. I think the water commissioner's statements of demand are reliable. It is part of his regular and continuous duty to ascertain that.

In making up my estimates for this case I gave no consideration to the matter of acreage, or the diversion of water per acre by various ditches, except in the case of the Highline.

The intake of the Platte Valley ditch is within the city limits of Denver, far down stream from the intakes of the Brown and the Petersburg. The Platte Valley ditch should be eliminated in determining demand on the canon, because it is supplied by inflow and seepage. Nevertheless I included it in making my estimate of demand.

Exhibit A-52, table 6, Brown ditch. I did not look up the number of acres irrigated. I eliminated the Brown ditch in determining demand on the canon, because it is supplied by seepage and inflow.

Exhibit A-52, table 7, Last Chance ditch. I stated that there were unsatisfied demands under the Last Chance ditch because the records show that the ditch has at times been shut down; nevertheless I took the average diversions of the ditch as showing its needs. I used that figure in all of my computations which had any reference to the Last Chance ditch. It was one of the methods I used in getting up my Exhibit 30.

Exhibit A-52, table 8, Northern Colorado Irrigation Company's canal (Highline). I said the demand ought to be the amount which it actually diverted in the years of abundant flow, instead of the average shown on the table. I do not think that the number of acres cultivated under that canal are limited by the quantity of water which the canal can divert and does divert in the average year. There is a greater acreage under cultivation than the average flow would justify. I do not know the actual acreage in cultivation under the Highline. It has been variously stated to me from eighteen to twenty-four thousand acres. I think it is approximately 20,000 acres. On the basis of average annual diversions, that means a little over two acre feet per acre, but there is a large loss in transit. That varies with the distance of the land to be irrigated from the intake of the ditch.

The supplemental supply which I had in mind for the Highline as mentioned in my direct testimony was the Antero reservoir.

611 I stated that the acreage would enlarge because of the reservoir supply, and so increase the demand on the direct appropriation. That would not be so if the supplemental reservoir supply was unable to furnish any water. The Lake Cheesman decree is prior to

that of the Antero. Nevertheless, Antero could fill when Cheesman reservoir is full so that it cannot store. If all the water stored in Lake Cheesman each year was stored and withdrawn, according to my estimates, as shown in Exhibit 30, there would be only three years out of fourteen when Antero could store. Such a supplemental supply as that would not, of course, affect the number of acres irrigated under the Highline as much as a more reliable supplemental supply.

A reservoir constructed at the present time, and subsequent in priority to Lake Cheesman and Antero, would be able to impound some water, because if located where the Two Forks reservoir is, the North Fork supply would be available. Some reservoir water from the Antero has been run through the Highline for the last year or two.

There has been a vast change in conditions since 1889 and the years prior thereto in respect to appropriations for storage or all-the-year-round rights. After the Lake Cheesman and the Antero priorities there come a number of other priorities for storage purposes, which take their waters from the South Platte river. According to my estimate here made, Lake Cheesman, having the earliest storage priority on the river with the exception of Barr Lake, could be filled in only three or four years out of a period of fourteen. Therefore a reservoir which comes in after the Antero and Cheesman and these intervening appropriations which have been made since 1889 would not have as good a chance to store, but there have been estimates made, and carefully made, that show there could be quite a little water stored in the Two Forks reservoir. I think "The Last Chance" would be a fair name to apply to such a reservoir.

Exhibit A-52, table 9 does not show an average of the two years. My statement in that regard on direct examination was a misapprehension. I had no occasion to use those figures, therefore gave them no critical examination. In considering this table I took the total diversions for the year 1913 and deducted therefrom the diversions of the Petersburg and Brown ditches, and in my cross examination have stated that the diversion of the Platte Valley ditch should also be deducted, making a total elimination, to offset seepage and inflow, of 14 second feet.

The intake of the Platte Water Company's ditch is three miles below the canon. It would have the benefit of some seepage and inflow. The Nevada ditch is still further down, and its intake is below Deer Creek, near Haworth's bridge, which is the point at
612 which seepage measurements are taken. There is a large accretion by reason of seepage and inflow at that point. I think, however, I have made proper allowance for seepage and inflow in entirely eliminating the Brown and Petersburg ditches and in measuring the needs of the other ditches by their actual diversions.

It was not seepage, rather than generosity and liberality, that controlled my conclusion in adopting as the needs of the ditches their actual diversions, but to say that my generosity and liberality was considerably diluted with seepage and return flow is a very nice way to put it.

As to the year 1913, Mr. Comstock testified that after permitting all the storage in Cheesman that he had estimated for that year,

there would be flowing in the river past Platte Canon 189, 230 acre feet, considering the stream flows for that year, which is very much above his minimum provision of 105,000 acre feet.

As to 1909, Mr. Comstock testified that after filling Lake Cheesman as he had estimated, there was left a total of 337,014 acre feet which would have passed Platte Canon in that irrigation season.

I assumed that all of the water that was diverted in 1909 through the intakes of the ditches was actually needed for the proper irrigation of lands under those ditches.

Review of Comstock's testimony relative to amounts passing down the river after storages had been made in Cheesman, according to his estimates.

If there were a surplus in the stream in any particular month, Lake Cheesman could have stored it, without regard to the fact, if it should also have been a fact, that there was a deficit in regard to the demands of direct flow rights in the preceding month, or that there might be one in the month following.

Rainfall has an influence upon the amount needed under the direct flow rights of ditches. In August, 1908, the rainfall was 3.19 inches, as compared with an average, for the 42 years during which records have been kept, of 1.36 inches. That is the largest rainfall that has ever occurred in the month of August in all those years. In October, 1908, the rainfall was 1.90 inches, as compared with an average of .94 of an inch. Such rainfalls would have a considerable effect upon the needs of direct flow rights.

Further discussion of Comstock's testimony relative to quantities passing down the river after the storages estimated by him, and their excess over the minimum demands of ditches as estimated by him.

613 Exhibit A-52, table 10. I assume that this table covers all the ditches reported upon by the water commissioner for the respective years. I do not know what ditches were not reported upon in any of the years. I do not regard the table as totally unreliable. I would be inclined to use the last few years, when the records were more complete, as giving a fair idea of what the conditions were.

13 or 14 acre feet per acre per annum is more than sufficient for irrigation purposes. I would not want to say that 7 acre feet per acre per annum is excessive. With the exception of the Highline, these ditches in District No. 8 are old ditches, and that is one of the reasons why they divert more water per acre, and still holler for more. The farmer must not waste water, but the courts have determined what he could use—they have given him a decree. So long as he does not exceed the total quantities of his decree, and so long as he does not waste water, in the sense of running it over vacant and unoccupied land or running it back into the river, he is in my judgment entitled to take it. I could not shut his water off on some opinion of my own that he was diverting more water than he needed. The court by its decree has determined that he needed so much. Unless waste is actually occurring, I as State Engineer would not turn off a man's headgate or stop him from taking water

from the ditch at the rate he was taking it, unless that rate exceeded the quantity named in the decree. As an executive officer of the state, I do not give consideration to the question as to whether the total quantity that is being diverted through a ditch is actually really needed for the beneficial use to which it is to be applied. I take into consideration only these two factors: First, what is the decreed quantity as stated in the decree?; second, is this ditch or this man wasting water by flowing it back into the river or flowing it out onto vacant land? If his structures were such that it caused a loss and waste of water, I would take that into consideration. But I would not take into consideration the quantity of water per acre which he is actually putting on his acreage, even though that be a very excessive quantity. I could not impose my opinion as to what constituted a sufficient supply.

As to the duty of water, taking all the lands in District No. 8 into consideration, 3 acre feet per acre per annum would, I think, be a fair average. To reach that average I assigned a higher duty of water in respect — lands outside of the river bottom—such lands as lie under the Highline ditch. The irrigated acreage under the Highline (20,000 acres) constitutes two-thirds of the total irrigated acreage in District No. 8. The land under the Highline ditch is
not river bottom land, but ordinary prairie land, and does
614 not differ in any material respect from the other prairie lands
on the eastern side of the mountains. It is about like our ordinary plains country.

The water districts covering the Boulders, Clear Creek, the Big Thompson and the St. Vrain, including District No. 3, are, broadly speaking, as to the character of the soil, whether gravelly or otherwise, and the proportionate quantities of different kinds of soil, substantially the same as District No. 8. They all lie along the mountain front and are on either side of quite similar streams. They were, geologically, doubtless constructed in much the same way and out of the same materials. These things being true, there is no particular reason why the duty of water should be lower, that is to say, why in District No. 8 there should be more water required in acre feet per acre than in these other districts.

On the older ditches in many of the districts you will find that the use of water is greater than on the newer ditches. There are very old ditches in all of these districts to which attention has been called. As between these several districts there would not be a great distinction in the amount of water per acre which might be used under the same conditions. There are quite a number of reservoirs in District No. 3, there are not a great many in 8. I think the existence of reservoirs makes for economy of use. With reservoirs there is always before the user the fact that if he does not use the water today he may use it tomorrow.

If District No. 8 were as well supplied with reservoirs as District No. 3, the duty of water in District No. 8 would be affected to the extent of ten or twenty per cent, making the average duty in 8 from 2½ to 2¾ acre feet per acre per annum. I do not know the

actual duty of water in District No. 3. That is a very prosperous farming section.

(The attention of the witness is called to the duty of water in Districts 3, 4, 5, 6 and 7, as shown by water commissioners' reports and the reports of the State Engineer.)

The figures as to duty of water which you have quoted to me correspond with figures in the State Engineer's biennial reports. Those figures show a higher duty of water than I had assigned to District No. 8. On the basis of these figures it would appear that 3 acre feet per acre per annum as the average for District No. 8 is excessive, but I think that is more in appearance than fact; first, because the water commissioner's reports as to acreage are inaccurate; second, because all the water used on that acreage is not shown in his reports. In those districts there is a considerable re-use of water. Of the water so re-used a great deal of it finds its way back into the stream before it is again diverted, but a great deal of it is picked up before it ever reaches the stream. In District
615 8 the irrigated area is not so wide and the re-use of water not so great as in District 3. I think the duty of water as shown by the figures in the reports of the water commissioners and in the State Engineers, reports, to-wit, 1.31 acre feet per acre per annum, is really a higher duty of water than the actual performance in district No. 3.

I recently testified as a witness in the case of the State of Wyoming against the State of Colorado. One of the things testified about was the duty of water in District No. 3. I testified that I had made a very careful and complete examination of that question. In that case the object in determining the duty of water in District 3 was to show what the accomplishment might be by the diversion of water from the Laramie water shed into the water shed of the Cache la Poudre. The method employed was first to determine the total amount of water which entered the district, then deduct the seepage and return and outflow, the difference representing the consumptive use. That amount I divided by the total acreage under ditches, showing a consumptive use of about one acre foot per acre. To ascertain the duty of water as ordinarily understood, you would have to add to the quantity of original water entering the district the quantity of seepage and return flow and divide the result by the acreage. I did that also in my testimony in Wyoming vs. Colorado, thus arriving at the actual duty of water.

In the case of the Poudre there is very little water that comes into the river below the mouth of the canon; in District No. 8 there is a considerable amount. In the present case the thing to be determined is how much water must be supplied from Platte Canon, just as in Wyoming vs. Colorado I endeavored to determine how much water was to be supplied at the mouth of the Poudre canon.

In the case of Wyoming vs. Colorado I did not determine duty of water as measured at the headgates of the canals. It would not be as great as my estimate in District No. 8, to-wit, 3 acre feet per

acre. The duty of water in the Poudre is stretched to what we might call the breaking point—it has reached the ultimate.

(His attention is called to conflicting statements in his testimony in that case. See Exhibit A-65.)

(His attention is called to said testimony, Exhibit A-65, as to the method pursued.)

In that case I determined that the total quantity of water entering District 3, both from the canon and from tributaries, was 367,313 acre feet per annum. From that I deducted 120,000 acre feet, being the amount passing out of the lower end of the district, making a net of 247,313 acre feet. That represented the consumptive use of water. 367,313 acre feet represented the original water entering the district.

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In determining the acreage in District 3 for the purposes of that testimony, I examined the acreage reported by the water commissioners and increased it by about fifteen per cent. For the year 1912 I took 265,000 acres, although the water commissioner had reported only 223,000. Dividing the water consumed in the district, to-wit, 247,313 acre feet, by 265,000 acres, made a duty of water in District No. 3, based upon the amount of original water entering the district, of less than one acre foot per acre, and I so testified. I also testified that the duty might in the future rise to ¾ of an acre foot per acre per annum.

I also estimated the duty of water in that district as measured at the headgates, and stated: "That the real duty and accomplishment which might reasonably be expected will be less than one acre foot per annum, and the use or duty as measured at the headgates of the ditches should be not more than 1.25 acre feet per acre per annum."

(His attention called to other statements in said testimony. See Exhibit A-65.)

The actual performance of water in all these other districts, the duty of water, including my determination thereof as to District No. 3, is a much higher duty and a much greater performance than that which I have assigned to District No. 8. When I said that duties of 7, 8, 9 and 10 acre feet per acre per annum under the ditches in District No. 8 was not an excessive use, I meant that the ditches were not necessarily wasting the water; that the lands under those ditches were different from the lands under the Highline ditch and from the average lands in the Poudre valley, and that the use of 7 acre feet did not necessarily mean a waste, and that 3 acre feet was not an excessive amount. In the upper part of District No. 8 2½ acre feet per acre per annum would be enough.

The water diverted in District No. 8 is used to some extent in adjoining districts, but the acres irrigated as stated in the reports of the commissioners would cover all of the acreage irrigated from ditches having their headgates in District No. 8.

The irrigated acreage in Districts 3, 4, 5, 6 and 7 amounts to about 60% of the total irrigated acreage in the entire Irrigation Division No. 1, and about 25% of the total irrigated acreage of the state.

Water commissioners' reports are unreliable, both in respect to

the acreage irrigated and in respect to the total amount of water used. The county commissioners, almost without exception,
617 refuse to pay the water commissioner for performing his statutory duties, and the water commissioner does not do any more of it than he has to. His pay, unfortunately, is under the control of the county commissioners. As to his appointment, that also is under the control of the county commissioners, for the Governor appoints according to their recommendation. That is the unfortunate part of it. The matter of his selection and the matter of his compensation is practically under the control of the various boards of county commissioners in the respective counties in his district, and the water commissioner himself is a local man, residing in the district. The amount of his compensation is also under the control of the county commissioners with respect to the number of days for which they will pay him. But in the districts here under consideration I cannot say that the water commissioners are not constantly employed. Notwithstanding this, I have made use of the water commissioners' reports as the best information available. The water commissioners are careless about the performance of their statutory duties, particularly in respect to the acreage irrigated, and in respect to failure to report upon all ditches.

Exhibit A-52, table 11.—My statement on direct examination that this table was of no value because based upon an assumption of a use of 76,000 acre feet per annum in District No. 8, was incorrect. I now criticise the table because Mr. Comstock took the flow of the stream for the month at two stations and subtracted, when as a matter of fact he should have taken the flow for each day. In my testimony in Wyoming vs. Colorado I employed the same method as Mr. Comstock has done, but that was for a different purpose. Said table No. 11 leaves out of consideration unsupplied demand. Moreover, in said table No. 11 the losses in the river have been taken by months instead of by days. From said table No. 11, for the year 1912 it results that the demand on the canon to supply the needs of District 8 was 61,130 acre feet. From the testimony of Mr. Comstock it appears that after the storage which he allowed had been made in Lake Cheesman in that year, there would flow out of the canon into District 8 245,632 acre feet, an amount very much greater than my estimates of needs, but I think my estimate of needs was too low.

156,210 acre feet per annum, used by me as the needs of District 8 in criticising Comstock's determinations, ought to be reduced by deducting for the Platte Valley ditch 1,639 acre feet, and for the Platte Canon ditch its winter flow, 24,000 acre feet, leaving about 130,000 acre feet, even on my own assumptions.

Exhibit A-52, table 12.—I criticise this table because it did not ignore the gains by months, but only the gains by years.
618 I criticised table No. 11 because, while it ignored the gains by months, it did not ignore the gains by days.

Mr. Comstock, after a consideration of tables 11 and 12, arrived at the conclusion that a mean annual discharge at Platte Canon of 75,000 acre feet would satisfy the demands in District No. 8. But

that is not as much as I consider necessary for the Highline ditch alone. From table No. 12 it appears that the consumptive use in the irrigation season only would average 58,605 acre feet. Mr. Comstock allowed 75,000 acre feet. Mr. Comstock's method as submitted in these tables was the same as that used by me in the case of Wyoming vs. Colorado, but there I used it for a different purpose.

For the purposes of table 12 Mr. Comstock has used all of the existing reports, but they are incomplete. I have used the same reports in my Exhibit 29.

I think information of the kind tabulated in tables 11 and 12 should be gathered and tabulated day by day. That is because conditions as to stream flow and the needs of the ditches vary greatly within short periods of time, so that it is necessary to determine these things day by day. For instance, there might be a deficiency in the first part of a month, but in the latter part such a surplus that the total flow of the month would be apparently sufficient for the entire needs, whereas, as a matter of fact, in the first part of the month there would be an actual deficiency. Such marked changes in conditions would have an effect on the possibility of storage in reservoirs. For instance, there might be a flood, when even for a single day storage might occur, and yet there might be a shortage in other days. Such floods do occur. The needs of ditches are affected by conditions which are independent of the quantity of water flowing in the stream. Rainfall is one of these. In arriving at my determinations in this case I have not made that analysis day by day, but have assumed an average demand per day for each month.

Exhibit A-52, table 15.—Seepage measurements are so made as to exclude the inflow from tributaries. I think the seepage return is fairly constant. The figures set down in table 15 accurately state the seepage measurements as made. I agree that the seepage return in upper District No. 2 is 55% of the total, and that in 1908 the total was, as stated in Mr. Comstock's table, 340.01 second feet. That would make 248,000 acre feet per annum, excluding inflow from tributaries and from the district above. 55% of that is 137,000 acre feet. The acreage in irrigation in upper district No. 2 being, as reported by the water commissioner, 38,193 acres, the quantity of water which comes back by way of seepage alone would
619 supply 3.6 acre feet per acre per annum. In addition to that, there are the tributaries, such as Cheery Creek, the sewer system of Denver, Clear Creek, Sand Creek, Dry Creek. This leaves out of consideration all of the water flowing down from District No. 8. In lower District No. 2 there are a number of tributaries. The important tributaries which flow into lower District No. 2 are the St. Vrain, the Big Thompson and the Cache la Poudre. The Poudre is actually the boundary between Districts 2 and 1. Its inflow is available in 1 but not in 2. It is not correct to say that the Poudre is a tributary whose waters are available in 2.

There is a considerable discharge from the Denver sewers, some

75%, I think, of the amount that comes in. In seepage measurements it is considered as a tributary, and it is a large tributary.

There is no gauging station on any of these tributary streams, and has never been for any considerable length of time. All any one can do is to estimate their inflow.

If in upper District 2 you add to the quantity of seepage return (137,000 acre feet) the inflow from the Denver sewers (35 or 40 thousand acre feet) and from tributaries (35 or 40 thousand acre feet, that would make a total quantity per annum of approximately 200,000 acre feet, which is much greater than the quantity (122,665 acre feet) arrived at by Mr. Comstock as the quantity returned into upper District No. 2 by seepage and by tributaries. He arrived at that result by taking 55% of the total return for the entire district. A similar result would be obtained by using the average seepage return as shown by table 15, instead of the seepage measurement of 1908. Mr. Comstock's determination of the tributary and seepage inflow into upper District No. 2 was therefore, if anything, too low.

Exhibit A-52, table 13.—It is my judgment that in reality there is actually more water to satisfy the needs in upper District No. 2 than Mr. Comstock estimated. As to table No. 13, my comment was as to the duty of water there shown, and that a duty of 3 acre feet per acre per annum did not seem to me to be excessive.

Exhibit 52, table 16.—My comment on this table would be the same as on table 15, although the possible error would be less because the distance is shorter. I have no doubt that Mr. Comstock has used as his basis the correct figures as shown by the reports. Above the Fulton ditch in District No. 2 there are some important accretions by inflow. I do not undertake to say that by Mr. Comstock's method he determined too great an inflow into upper district No. 2, or into that portion of upper district No. 2 above the Fulton ditch. The principal tributary inflows into upper district
620 No. 2 occur above the Fulton ditch. In my judgment Mr. Comstock's conclusions are not excessive as to what may be expected by way of accretions in that part of upper District No. 2 lying above the Fulton ditch.

As to Exhibit 30, prepared by myself. In that I was trying to estimate the quantity of water storable in Lake Cheesman, first endeavoring to estimate the demand on the flow at Platte Canon, which must be satisfied before Cheesman can store. As to the needs of District 8, I arrived at that by taking the figures of Mr. Comstock as to certain of the ditches and adding 75,000 acre feet for the Highline, making a total for District 8 for the irrigation season of 106,400 acre feet. That amounts to 3.82 acre feet per acre per annum for the acreage irrigated in District No. 8, measured in terms of original water, without considering the effect of inflow and seepage in District No. 8. That is the demand of District No. 8, according to my estimate, upon original water alone. I think it is not excessive. This is so, notwithstanding that I have already stated that the duty of water in District No. 8, measured at the headgates of the ditches, would be an average of 3 acre feet per acre.

What I mean by demand is the quantity which the ditches use, if it does not exceed the quantities specified in their decrees, providing they do not waste the water. The court has already determined for us what is the proper amount—that is determined in the decree. In estimating this demand I do not undertake to determine whether, in accordance with proper irrigation practice, the ditches need such a quantity of water.

The accretions in District No. 8 from seepage and inflow amount in the irrigation season to approximately 53,740 acre feet. Adding this to my estimated demand on the canon results in a duty of water of 5.75 acre feet per acre per annum for the acres irrigated.

In distributing the water used by percentages to the various months in irrigation season, I do not think I made a total of 105%. I did not intend to.

In making up my Exhibit 30, the demands on the canon for District No. 8 as estimated by me were as follows: April, 100 second feet—5%; May, 275 second feet—14%; June, 520 second feet—26%; July, 500 second feet—25%; August, 275 second feet—13.7%; September 180 second feet—9%; October, 100 second feet—5%. Then for each of the months I added 66 second feet to cover direct flow rights of the Water Company.

If in my direct examination I gave percentages yielding a total of 105%, that was, of course, incorrect, and should now be excluded.

Upon this new apportionment, and deducting the Platte Valley ditch, my estimate requires 106,000 acre feet at the canon to supply District No. 8. But computing it according to the rates
621 of flow given, it amounts to a total quantity for those months of 119,300 acre feet. Later I combined these figures with those for District No. 2 and then made a slight reduction in the different months.

As to the demand of ditches in District No. 2, I considered that by an analysis of the water commissioner's reports. I first determined the demands of the ditches, by taking the statements of the water commissioner's reports as to what each ditch received, and also as to what was being demanded and not received. I took the sum of these and from them made certain deductions. The conditions in respect to the Burlington Ditch and the Highline Ditch were really the controlling factors. When these ditches were not drawing water, then the stream flow was insufficient to supply the demand, and therefore insufficient to permit storage. Whenever either one of these ditches was not drawing water, I deemed that to be a period when no storage could occur at Lake Cheesman. When the Burlington and the Highline, or either, was not drawing water, or was not drawing a sufficient amount, then I investigated the water commissioner's reports to ascertain from them what the demands were for unsupplied water. In that way I determined how much more ought to be flowing at the canon than was actually flowing in order to supply the demand. The unsupplied demand was determined on what was reported in the water commissioner's reports. From those statements I made certain deductions. In that respect there are some uncertain elements. I gave so many things consideration that it is difficult for me to state them.

Exhibit 35, sheet 2, referred to as an illustration of the method.

In making my estimate of demand for District No. 2 I have not considered the flow from tributaries, other than the flow at Denver, in the South Platte, except that I have made certain deductions from the demand as reported by the water commissioner. In some instances I increased the demand as shown by the water commissioner's reports, while in other instances I decreased it, because I was working towards an average. I wanted an average which would apply for almost any year, and I studied the particular year in order to help my judgment to arrive at what would be the ordinary demand. I rejected the data for that particular year because the demand in that particular year will not be the average demand. No one year represents an average demand for all years. The determination of that average demand is a matter of judgment.

Exhibit 35, sheet 2, further explained.

When I set down figures differing from the demand as stated by the water commissioner, those figures represented what in
622 my judgment would be necessary on the average, or in ordinary years; partly that and partly what I thought was necessary to supply the needs in a particular month of a particular year. Those elements entered into the determination about half and half. Where I decreased the water commissioner's figures, it was because I wanted to be sure that the demand which I stated was necessary was no more than it really was. Where I increased his figures, it was in an effort to arrive at something of an average.

I made examination here of two years for the purpose of determining by consideration of the two what might be a fair average. I changed the figures with the idea of getting an average.

Exhibit 35, sheet 2, further explained.

In some instances I reduced the commissioner's statement as to demand because I thought it was too large.

Exhibit 35, sheet 2, further explained.

There are large accretions in District No. 2 from seepage and tributary inflow. The demand in District No. 2 will be reflected up the tributary streams, as well as up the main stream.

In my Exhibits 33 and 34 I have shown unsupplied demands in District No. 1, but the quantity of that unsupplied demand and the ratable proportion of it which ought to be supplied from Districts 3, 4, 5, 6 and 7, rather than from District 2, I have not undertaken to estimate.

As to District No. 8, in criticising Comstock's testimony and tables I assumed a demand upon the canon aggregating 106,373 acre feet, leaving out of consideration the diversion for certain ditches, aggregating 6,543 acre feet, because they were supplied by seepage and inflow. The seepage and inflow in District No. 8 is a much greater quantity than that, the seepage return in the irrigation season being about 34,240 acre feet, and the tributary inflow about 19,500 acre feet, amounting in the aggregate to 54,080 acre feet during the irrigation season. All of this, of course, is not available for the ditches higher up in the district, like the Highline.

I made a deduction on account of seepage and inflow in 8 from my estimate of demands in 2. We can, therefore, take up that ques-

tion of seepage and return flow in 8 in connection with my estimate of demands in 2.

In criticising Comstock, I assume the following as the demands of the ditches in 8: May 261 second feet, June 450, July 438, August 349, September 180, and October 90. Deducting the Platte Valley ditch, this means 106,300 and odd acre feet for the irrigation season, for irrigation uses only.

623 In my Exhibit 35, on the last page thereof, my estimate of demands in District No. 8 during the irrigation season, deducting the 66 second feet estimated for the Water Company's direct flow rights, would be as follows: April 100 second feet, producing 6,000 acre feet; May 275 second feet, producing 17,050 acre feet; June 520 second feet, producing 31,200 acre feet; July 500 second feet, producing 31,000 acre feet; August 479 second feet, producing 29,698 acre feet; September 180 second feet, producing 10,800 acre feet; October 100 second feet, producing 6,200 acre feet; or an aggregate, for irrigation purposes only, for District No. 8 of 131,948 acre feet, representing the demand on the canon. As these were the figures which I finally took it appears that I did not accept any of Mr. Comstock's figures as to this demand.

Previously in my cross examination I have given figures for that demand aggregating 119,300 acre feet. That is the figure which I really finally adopted. The difference between that and what is shown in the last page of Exhibit 35 is apparently in the figure for August. For that month I put down 545 for District 8 and then deducted 239 from the sum of the estimates for Districts 8 and 2. I put down as the demand for August in District 8 the average flow at Platte Canon as shown by sheet 4 of Exhibit 35. I considered that to be the demand for that month. For every month except August I wrote down on my final sheet the assumed demand shown on sheet 4, but for August I wrote down the average flow at the canon. In my direct testimony I had stated that 545 was the figure I used, and I wanted to preserve that figure so that the exhibit would conform to my direct testimony. The deduction of 239 second feet is made arbitrarily. The deductions made for other months are relatively much smaller. These deductions were made to conform to the preconceived opinion I had formed as to what might be an average demand.

My Exhibits 33, 34 and 35 deal with this question of demand. The last sheet of Exhibit 35 shows my final conclusions.

In my direct testimony I stated that the facts which I had given relative to demand related to the year 1912, but the figures which I gave related to the year 1913. I got the years mixed, and I think in one case even the districts mixed, reading from my pencil notes. I suppose I drew conclusions in respect to 1912 from figures which pertained to 1913. Therefore my direct examination on that point must be largely disregarded and my tables, Exhibits 33, 34 and 35, examined exclusively as my proper testimony. I stated my conclusions in direct testimony and supported it by details which I now say were erroneous. I now undertake to support the conclu-

624 sions then given by these three exhibits. I found that there was something radically wrong, and so requested that I be per-

mitted to submit these figures. The figures which I now submit as pertaining to the year 1912 are altogether different from those given on direct examination for that year. Nevertheless, I think my conclusion was correct. These tables were prepared for presentation after I had given my testimony on direct.

Exhibits 33, 34 and 35 are intended to set forth the statements contained in water commissioners' reports. I do not consider these reports entirely reliable. It is the best information we have. Neither do I consider them quite unreliable. I consider them fairly reliable, except in the matter of acreage. Not absolutely, of course.

In my judgment as an engineer and a man of experience, it is necessary to take into consideration surrounding circumstances and conditions, aside from the mere demand of ditches on one particular day each week, in order to find out what the real average demands or necessities are. If such information is available, it should be used. I have taken the statements of the water commissioner as to what was needed to supply the demands or desires in his district on a particular day in each week. From that I have arrived at a conclusion as to what the average necessities were for that week or for the months taken by weeks.

Great variations in the necessities of ditches are caused by various things, like rainfall, variation in the flow of the river, etc. In considering these two years, with a knowledge of the relative demands in the different months, and taking four days in each week, I think that you would get a very fair average. It would be better, of course, if you knew what the actual demand was for each particular day; but we have not that, so we take what we have. Sometimes they are too large and sometimes they are too small, but on the whole I think they will average up fairly well.

Exhibit 35, sheet 2, deals with District No. 2 for the year 1912. On June 22nd the water commissioner's statement of demand is equivalent to a statement that all needs were supplied. As a rule the water commissioner states the demand in even hundreds. I did not consider the surrounding circumstances on June 22nd, as, for instance, the quantity of water entering District No. 2 from sources other than the flow of the river at Denver. The water commissioner reported such facts, but I did not investigate them. On that day he reported that there were 1,200 second feet entering the district from sources other than the Platte river at Denver. Adding that to the flow at Denver, there was nearly three times as much water in the district on that day as the canals required. My
625 exhibit does not mean that 700 second feet was actually the demand on the flow at Denver on that day, but that under any and all ordinary conditions that demand would be 700 second feet.

On the 20th the Highline in District No. 8 was carrying 250 second feet, which was probably not as much as it desired. There is on file in the State Engineer's office a permanent request from the Highline ditch that whenever water is available in the stream it be turned into their ditch to the full capacity. Therefore I consider that the unsatisfied demand of the Highline is represented by

the difference between the water running in the ditch and the full capacity of the ditch.

I cannot determine for them what the reasonable demand is. I must distribute water in accordance with the decrees. When the water commissioner states the last ditch that he is serving, I take it to be true that there is an unsupplied need in ditches not receiving water. With the data at hand and the variations we have had here in the distribution of water, we cannot reduce everything to an absolute mathematical certainty.

Exhibit 35, sheet 2, June 22nd. With accretions to the stream by inflow and seepage as reported by the water commissioner, the ditches above Clear Creek in District No. 2 would be the only ones which would not be supplied by such accretions. Those ditches are the Farmers and Gardeners and the Burlington. The Farmers and Gardeners is supplied by Denver sewage, leaving only the Burlington to be considered, and on June 22nd, notwithstanding the great flow in the river, the Burlington was drawing only 100 second feet. Possibly that flow was needed for Districts 1 and 64, but I did not investigate that question. The actual demand on the flow in the Platte River at Denver on June 22nd by District No. 2 was, therefore, 100 second feet, which was being used by the Burlington. Nevertheless I put down in my column of estimated demands 700 second feet, as representing the normal demand at that time of the month. Sometimes I consider the side notes in the water commissioners' reports. Do not remember whether I did so on that particular day. On that day water commissioner reports "Heavy general rains on Monday the 17th." Also, "Condition of district regarding irrigation, supplied." That indicated that the 100 second feet being drawn by the Burlington supplied their needs and desires.

In determining average needs and demands of ditches, it would be better to take a long series of years, but unfortunately we did not have the same complete data in the other years. I actually considered just the two years, 1912 and 1913. But the final results shown by me are not the average of those two years. 1912
626 was perhaps unfortunately selected by me. I found a great deal of difficulty in that year, by reason of the fact that there was a large surplus on many days. I do not think it entirely necessary to consider the conditions as they occur from year to year over a long period of years, before being in a position to say what ought to be true on the average. I think by a consideration of 1912 and 1913 we could determine what the approximate average demand was.

Exhibit 35, sheet 2, June 29th. According to the water commissioner's report there was no unsupplied demand, but I reduced his stated demand from 980 second feet to 700 second feet. Therefore, both on June 22nd and June 29th I have taken as the demand on the stream flow at Denver figures not justified by the facts as to either day.

On June 29th 500 second feet was being diverted by the canals for storage. If Barr Lake had then been supplied, the storage would then be under a right subsequent to Cheesman. Barr Lake

is usually filled in the winter, more particularly in September, October and November. They usually take the very first water available for storage. As a general rule, and almost invariably, Barr Lake's priority is filled before the irrigation season begins; therefore it is a fairly safe assumption that this 500 second feet being diverted on June 29th was under a storage decree subsequent to Cheesman.

I did not consider what the accretions to the river were below Denver on that date. It appears that the inflow from tributaries for the week ending June 29th was at the rate of 1800 second feet, and the accretion at the rate of 300 second feet. That was nearly three times the quantity of water used by the canals. Therefore it is probably true that there was no demand upon the flow of the Platte at Denver except to supply ditches above Clear Creek.

I did not investigate the demands in the districts below No. 2. There were nearly 1400 second feet passing from District No. 2 into District No. 1, and the average for the previous week had been over 2000 second feet. The only thing I had to consider at all was the demands of ditches above Clear Creek in District No. 2 as a demand upon the flow of the river as it passed Denver. The Burlington and the Farmers and Gardeners were fully supplied, therefore there was not any demand at all for District No. 2 upon the stream flow at Denver on that particular day. Nevertheless I put down an estimated demand of 700 second feet.

1912 was a year of satisfactory flow. The greatest diversions occur in the years of large flow, but not the greatest demands. The figures I put down on sheet 2 of Exhibit 35 do not represent my conclusions for the year 1912. Those conclusions represent
627 what in my judgment would be the demand in normal ordinary years. The figure put down by me for June 29th is what I considered under ordinary conditions would be the average demand for that time of the year, not the absolute figures for that particular day. These figures of mine, instead of being a deduction from the facts appearing on the particular day in 1912, represent a deduction of my own as to what the demand would be on the average, for the average year, and under average conditions. All of these figures are my judgment on the matter. That conclusion depends upon my judgment and experience, and on the examination of other records, particularly Exhibits 33 and 34 and the conclusions of Mr. Anderson and Mr. Comstock.

Exhibit 35, sheet 2, June 29th. As of that date the water commissioner's report has side notes as follows: "Weather for week has been, showers;" "condition regarding irrigation, fine." June, 1912 was unusual, and differed from the average month of June.

I have put down on the last sheet of Exhibit 35, which represents my final conclusions, none of the figures which I arrived at as shown and set forth on sheet 2 of Exhibit 35, which pertains to the year 1912. None of the conclusions which I put down on said sheet 2 in respect to the year 1912 has been carried into my final conclusion on the last sheet. The figures set down by me as my conclusions on sheet 4 of Exhibit 35 are the exact figures carried into

the final sheet, or final summation. Said sheet 4 relates to the year 1913, but they did not necessarily have to be for that year. Nevertheless the figures for 1912 affected my final conclusion.

In assuming that the flow of the stream at Denver at times when the ditches in District 2 are approximately supplied represents the demand of District 2 upon the Denver flow, and in assuming that the unsupplied demands of ditches in District No. 2 must be supplied in their entirety by water flowing past Denver, I have assumed that the other districts tributary to District No. 2, such as Districts 3, 4, 5, 6 and 7, were not improperly withholding water. I made some investigation respecting those ditches. I studied a tabulation which the division engineer had once made for use in connection with the demands of the Highline. This tabulation showed that nearly all of the ditches in all of these tributary districts were prior in point of time to Lake Cheesman, also prior in point of time to the Burlington. But I did not take up the consideration of diversions in the tributary districts with respect to the individual days when I was estimating the demands of District No. 2 upon the stream flow at Denver. If a ditch in a tributary
628 district is diverting water which is needed by a ditch in District No. 2 having an earlier priority, that water should be allowed to flow down into District No. 2. Therefore the mere fact that a certain ditch or ditches in District No. 2 are not getting all the water that I assumed they needed, does not necessarily indicate that that unsupplied need constitutes a demand upon the stream flow at Denver. It might be a demand upon Districts 3, 4, 5, 6 and 7. If a water commissioner in his report makes a demand for more water for his district, I regard that as conclusive evidence that there is an unsupplied demand for ditches prior in point of time to Lake Cheesman.

Exhibit 35, sheet 2, 1912, June 1st. According to the water commissioner's report there was an unsupplied demand of 173 second feet. Of this I have put down 5 second feet as the unsupplied demand on the stream flow at Denver, the total unsupplied demand being 173 feet. I do not know how much of this ought to have been supplied by the stream flow at Denver and how much ought to have been supplied by the inflow from tributary districts. That is one of the uncertainties—I do not know. The fact of the matter is that frequently, even though water is available, ditches do not draw it.

The Highline canal has an appropriation dating from 1879, which is three years later than the latest ditch drawing water in District No. 2 on June 1, 1912; nevertheless, the Highline on that date was drawing water at the rate of 500 second feet, had been drawing at the rate of 290 second feet in the preceding week, and continued to draw in large volume throughout the following month. As the rate of draft of the Highline was reduced, I assume that that reduction was by order of the Division Engineer, although I do not know. I did not examine the record of the action of the division engineer in that regard. However, I think it safe to assume that when a ditch is not drawing water it needs it, and therefore there is an unsupplied demand.

Exhibit 35, sheet 2, June 8. The water commissioner reports an unsupplied demand of 312 second feet. Of that I take only 15 second feet as the amount which ought to be supplied by the flow at Denver, in addition to what said flow actually supplied, and thereby arrive at 700 second feet as the demand of District No. 2 on the stream flow at Denver. I thought that 700 second feet would represent about the minimum of that demand. I might just as well have put down 685 second feet.

It appears from the water commissioner's reports that in District No. 2 at this time junior ditches were drawing water where senior ditches were not. It also appears that 322 second feet passed out of the district at the lower end. There were deficiencies in District No. 1, but I do not know whether they were in ditches prior
629 in point of time to Lake Cheesman. I do not know whether I investigated that question or not in respect to any of the shortages in District No. 1. I would not say that I had investigated it. Such shortages or deficiencies in District No. 1 could not affect the right to store in Lake Cheesman unless the ditches in question had decrees prior to that of Cheesman.

Exhibit 35, sheet 2, 1912, June 15th. The water commissioner reported a shortage of 395 second feet, which added to the stream flow at Denver made approximately 700 second feet. The latter figure also was my estimated demand for that day. But that is a mere coincidence. I would probably have arrived at the same conclusion though the water commissioner's figures had been different. I assumed that the demand is fairly uniform, and I used that figure in arriving at an average, although the amount which I added to the stream flow on this particular day was out of all proportion to the quantities added for other weeks in the same month, and although the relation of said added quantity to the deficit as reported by the water commissioner was out of all proportion to the relation of like additions made in some other weeks to the deficits as reported by the water commissioner. My purpose was to get a somewhat uniform demand for the month. On that particular day possibly a flow of 700 feet at Denver was not necessary, but in that period of the year, as shown by uses before and after that day, I concluded that 700 second feet for that week was justified.

On June 14, 1912, the last ditch drawing water in District No. 2 had a decree of 1885 and was drawing 20 second feet, and on June 17th it was drawing 100 second feet. On June 15th the water commissioner reported the last ditch drawing water in upper District 2 was of date July 8, 1876, getting 100 second feet, and in lower District 2 the last ditch getting water was of date 1874. Practically the same situation as on June 1st. It also appears that during all that time, practically from June 1st to June 15th, and later, the Highline ditch in District 8, with a decree dating from 1879, was drawing water at from 425 to 475 second feet. If the various ditches in District No. 2 with decrees prior to the Highline were actually needing water during that period, the Highline ought to have been shut down. But the fact that it was not does not necessarily indicate that said ditches were not needing water.

There seems to be a conflict between these two sets of reports of the water commissioners, There is also the element of time to be considered, and the fact that the water officials are not always able to regulate things as they should like to. One or the other, or both, sets of water commissioners' reports must be inaccurate. I
630 think the twice a week reports of the water commissioner are a little more accurate than his weekly report.

Exhibit 35, sheet 2, "See page in District 8." Taken from water commissioner's weekly reports. The figures given are an approximate average for the month. That column covers not only seepage, but also inflow as reported each week by the water commissioner. The figures here put down are the monthly averages of the water commissioner's weekly statements. It appears that the average for April is not the average of the water commissioner's weekly reports. I have forgotten how I arrived at that figure. It also appears that the figure put down in Exhibit 35 for May is not the average of the water commissioner's weekly reports. I cannot account for that. The same is true of June, July, August, September and October. I had an assistant in getting those averages, and I do not remember now just what was done.

The figures for seepage on sheet 2 of Exhibit 35, except for the month of September, when they agree with the averages of the water commissioner's returns, and except for the month of April, are all of them below the averages of the water commissioner's returns. I cannot say just how that happened. In my Exhibit 35 I undertook to deduct all of the seepage and inflow in District No. 8 from the demands of District No. 2 upon the stream flow at Denver. The water commissioners' statements as to seepage and inflow are largely estimates.

As to the flow in the main stream, I have taken the hydrographic records in the State Engineer's office instead of the water commissioners' reports, because I consider them more accurate.

The water commissioner in District 8 and the water commissioner in District 2 ought to read the gauge in the Platte river at Denver in approximately the same way. One, though, might read it at one time of the day and the other at another time, which would make some difference. As a matter of fact, it is probably true that the commissioner of District 8 does not read the gauge at Denver as often as the commissioner of District 2. I am afraid the water commissioner sometimes reports these stream flows without reading the gauge. I would say he roughly estimates it.

These water commissioners do try to favor their own districts. Like members of Congress, they try to get as large appropriations as they can for their respective districts. Each man's particular interest is in his own district, and he works for the interest of his own district. He is a local man, appointed out of a list of men presented by the boards of county commissioners in his district.

631 The action of the division engineer upon the conflicting claims of the commissioners of the various districts would indicate how much of unsupplied demand, if any, of District No. 2, for example, ought to be supplied by the sending down of more

water from District No. 8, or by the sending down of more water from the other districts, which are tributaries to District No. 2. The division engineer determines the amount which each must contribute.

There are wide discrepancies between the statements of the commissioners of Districts 8 and 2 concerning the outflow from 8 and the inflow from 2, although it is the statutory duty of those commissioners to report such fact, and although their determinations ought to be exact, because they depend upon the reading of the same gauge here at Denver. (The attention of the witness is called to many such discrepancies.) These discrepancies are accounted for, of course, by the desire of each commissioner to favor his own district, and also the commissioner of District No. 8 is more inclined to guess at what the gauge is going to read by observing the flow above, and then he thinks it ought to be about so much. (The attention of the witness is called to other discrepancies of like character.)

These figures show that the water commissioners' reports of flow in the main stream are not as reliable as the hydrographic reports. Their duties are such that very often they cannot visit the gauge just when they want to or just when they should. I should say that the water commissioners' estimates of flow in the main stream, where they have a gauge to read, would be more accurate than their estimates of the flow from tributaries and of seepage, which are purely estimates, without gauges to guide them.

As to the estimate of seepage, the water commissioner arrives at that by an arithmetical process, as follows: From the total amount distributed to the ditches in his district, plus the total flow out of his district he deducts the amount of the inflow on the main stream, and this gives him the amount of accretions in his district from tributary inflow and seepage. To make this result accurate he must know accurately what is coming into his district and what is going out of his district. He must either gauge or estimate the inflow of the tributaries. There are no gauges on any of the streams tributary to Districts 8 and 2. The estimates of the water commissioners are the best information we have as to that. The water commissioners guess at the amount of the tributary inflow. As to seepage inflow, they have still less data to guide them.

As to Exhibits 33, 34 and 35, the data which they include was obtained as follows: As to stream flows, from State Engi-
632 neer's hydrographic records; as to quantities of water diverted by canals, from water commissioners' weekly reports; as to quantity of water so diverted which consisted of stored or reservoir water, also from water commissioner's weekly reports; as to quantity of water so diverted for purposes of storage, also from water commissioners' weekly reports; as to seepage and return flow, also from water commissioners' weekly reports; as to demands of the ditches, also from water commissioners' weekly reports. I took the State Engineer's hydrographic records for stream flows, instead of water commissioners' reports, because I thought them more accurate. There is no reason to believe that the water commissioners' statements as to stream flow are less entitled to credence than their statements

as to seepage and inflow, but I took the water commissioners' statements as to seepage and inflow because I had to in our hurry to make the record.

As to the demands of ditches listed by the water commissioner in his reports, if a ditch requests a certain quantity of water, and if that quantity of water were less than the quantity decreed to that ditch, such a request would undoubtedly have an effect upon the quantity which the water commissioner would set down as the demand of his district. I do not know just what influence those requests have on the water commissioner's statements of demand as made in his reports.

As to the water being actually diverted by ditches, the water commissioner depends to some extent on the statements of the ditch people themselves. But it is the practice of nearly all water commissioners and their deputies to have what they call private marks on ditches, which they can observe as they pass along. That is not a very accurate method of determining the flow in a ditch. It would be an estimate only.

As to diversions, all that the information tabulated in Exhibit 35 shows is simply the total amount being diverted, and it is impossible to tell what ditches were diverting the water and how much is being diverted by the individual ditches.

In Exhibit 35, table 2, the figures which I have put down under the column "Estimated Demand" were figures I had in mind as to what probably would be true in the average year, without regard to the particular facts as shown for that particular year, or rather for that particular day, upon the water commissioners' reports. I did not investigate to determine what action the division engineer had taken in respect to the demands of the various water commissioners, or in respect to the distribution of water in view of those demands.

Exhibit 35, sheet 4, relates to both District 2 and District 8 for the year 1913. So far as it relates to District 8, it sets forth
633 the same data appearing upon Exhibit 35, sheet 3. (The two sheets here explained.)

Exhibit 35, sheet 3, figures designated "Average Assumed," represent the amount necessary to flow at the canon in the average year to supply the needs of District 8. These amounts do not correspond with those entered in respect to District 8 on the final sheet of Exhibit 35. That is because I was treating the matter in a different way.

The figures on the last sheet of Exhibit 35 pertaining to District No. 8 also include the Water Company's diversions.

As to the average assumed for August on sheet No. 3, the difference between that and the figure on the last sheet of Exhibit 35 is due to the fact that in my original testimony I used 545 for that month, and felt it necessary to put it down in the exhibit. 545 was the average flow at the canon.

The figures pertaining to District 8 on the last sheet of Exhibit 35 include the 65 feet as the constant demand of the Water Company for its direct flow rights, but those on sheet 3 do not, nevertheless the figures on sheet 3 are higher than those on the final sheet.

Exhibit 35, sheet 4. On this sheet there is assembled information relative to both districts for the year 1913.

Statements on sheet 4 of Exhibit 35 compared with statements in Exhibit 33 and 34, with other statements in the water commissioners' reports, and with the record of diversions of the Highline ditch.

As to June 7, 1913, Exhibit 33 states that the latest ditch drawing water in District No. 8 was 1873, and on June 16th 1868; and in District No. 2, 1877 and 1876. Comparing those with the statements on sheet 4, Exhibit 35, it appears either that there is something wrong about the tabulations made by me, or that there is something wrong about the water commissioners' reports from which the tabulations were made. Sometimes the early priorities do not demand water when the later priorities are getting it. The mere fact that a ditch is not at any particular time drawing water, or is drawing only a part of its priority, does not necessarily indicate that it needs that portion of it which it is not drawing.

Exhibit 35, sheet 4, portion relating to District 2, month of June. To the average flow at Denver, 666 second feet, I added 34 second feet, making a total of 700 second feet, and then deducted 106 second feet, which I designate as seepage; that stands for seepage in District No. 8. In arriving at the average flow at Denver I took the average of the first, second and fourth figures in that column, omitting the third figure relating to the flow on June 21st. The figure which I took is not even the average of these. I took
634 666, the average being 663, but if I had taken 633 I would have added 37. I resired to reach the round number 700.

When the Burlington does not draw in the month of June, I assume that there is an unsupplied demand on that account of 150 second feet. I use a certain amount of judgment and reason. In this case 34 second feet is the extent of my judgment and reason as to the unsupplied demands which ought to be supplied out of the flow at Denver. While the unsupplied demand as reported by the water commissioner was greater than this, I did not undertake to apportion it between the flow at Denver and the tributary inflow. I simply said this: that there should have been something more than the average amount flowing past Denver, and the nearest even figure, and the even hundreds of second feet, was 700.

It is not necessary to determine the average flow of the stream past Denver, although we are trying to determine the average of the unsupplied demand which ought to be supplied from that source.

As to the month of June, 1913, the real conclusion I came to was that there ought to be more than 666 second feet flowing in the river past Denver, therefore I added 34 to make an even 700. I took what I considered to be the minimum that I could see was necessary, and called it 700. What I really did was to determine, by some means or other, that 700 was the quantity that ought to be flowing past Denver. Then I added 34 to 666, so that it made an even 700, as a matter of arithmetic. 34 simply represents a figure that I took in order to bring the result to 700, and my conclusion would have been to the same whether the Burlington on June 7th

had been drawing water at the rate of 100 second feet or whether it had not.

Exhibit 35, sheet 4, month of July. To the average of the stream flow at Denver I added the arbitrary figure 68, to bring the total up to 700. That addition was made upon the same principle and for the same purpose as the addition of 34 in the month of June.

There were unsupplied demands on July 19th, notwithstanding a flow in the river of 1115 second feet, although in the following week, with a much less flow in the river, the Burlington ditch, with a priority of 1885, was drawing to the full extent of its desire. I concluded that there was an unsatisfied demand on July 19th, merely because ditches after 1876 were not drawing on that day.

On July 17th and July 21st there were unsupplied demands in District No. 1, but I do not know whether any of these were by ditches prior in point of time to Lake Cheesman; nor did I
635 investigate whether that unsupplied demand would be re-reflected back to the canon.

As to July 9th, the report of the water commissioner in District No. 2 says: "Used by ditches for irrigation, 1400 second feet," also "Total amount of water necessary to supply the present needs is 1400 second feet." Although I think the fact that the Burlington was not drawing water was sufficient to indicate unsupplied demands, I would be inclined to take the water commissioner's report to the effect that there was no more water needed.

All of these computations which I have made in respect to demands on the flow of the river at Denver, and in respect to demands on the flow of the river at Platte Canon, are arrived at by similar methods to those which I have now described. The figures thus arrived at, as shown upon sheet 4 of Exhibit 35, are the ones which I have carried forward to the final sheet of Exhibit 35. The individual figures entered on that final sheet, as regards the respective districts, are the conclusions expressed on sheet 4 of the exhibit, of the demand of each of these districts on the canon, which conclusions are also influenced by the other sheets in the exhibit. After adding up the figures for the two districts, I made a deduction therefrom. I wanted to be sure that the figure was not excessive, and also I wanted to deal with round figures rather than exact figures. Some of them I did not reduce at all, and others I reduced, not by percentages, but by absolute amounts. The ratio of reduction differed quite widely for different months. In the large months it was my purpose to arrive at the nearest thousand, in the small months the nearest hundred. I exercised my judgment. The final amount represents my final and best judgment.

In the month of August 545 was set down by me because I had mentioned it in direct examination. As a matter of fact, that, instead of being my estimate of demand in District No. 8 for that month, was my statement of the stream flow. Nevertheless, I set it down and made a deduction sufficient in quantity to reduce the total for the month of August to 700.

I have now explained as fully as I can the method by which I arrived at my determination of the quantity of water which must

have been flowing at Platte canon in each month; that is to say, the rate at which it must be flowing, before Cheesman could store, and the quantities assumed by me for that purpose in preparing my Exhibit 30 are those set down on the last page of Exhibit 35 after the words "Final Amount."

636 (Figures quoted from water commissioners' and division engineer's reports as to acreage, diversions and demands in District No. 2 for the years 1911 and 1912.)

The duty of water from the irrigation works, such as reservoirs and ditches, is considerably affected by weather conditions—that is, rainfall—in a particular year. The rainfall in 1912 from April to October amounted to 15.01 inches, being about 25% above normal. Such rainfall means an addition of 1¼ acre feet per acre to the amount supplied by the ditches. The rainfall in the months of April to October, 1913, was apparently less than normal.

As to duty of water for lands in the vicinity of Denver, I think probably 2½ acre feet per acre per annum would be all right.

I am the author of United States Department of Agriculture Bulletin No. 118, entitled "Irrigation from the Big Thompson River." In that I gave a tabulation of the use of water from The Big Thompson River for 1901, showing a duty of water there of 1.91 acre feet per acre per annum, including reservoir water. In that article I said: "The duty of water, it will be noticed, in the district is 187 acres per cubic foot per second, running 180 days, and the land was covered to an average depth of 1.9 feet." In my testimony here about the City Ditch, I said that a second foot would irrigate about 38.4 acres. In that same article I said: "The possession of an old and abundant water right does not convey the right to use the privilege wastefully and to the harm of others less fortunate. In practice, however, it is impossible to prevent this abuse, which is illegal and to be condemned." I am still of the same opinion. But I do not think you could prevent the use of water unless it is really a waste. The courts have determined that for you, as I said before, and these are legal vested rights that must be respected. In that article, in support of the paragraph last mentioned, I cited Session Laws of Colorado, 1895, page 197. That statute prohibits not only the waste of water, but also a wasteful or extravagant use of it by the consumers.

In Exhibit 35, on the last page, I have set down the total quantity of second feet which must each month be passing Platte Canon before storage is to be allowed at Lake Cheesman. That is the quantity of so-called original water, originating at and above Platte Canon, necessary to supply these prior direct irrigation rights. Flowing at the specified rates, those requirements would produce in the months of April to October, inclusive, 248,000 acre feet. Deducting from that the 28,000 acre feet that goes to supply the Water Company's direct flow rights, leaves 220,000 acre feet of original water

637 proceeding from the canon for the irrigation of 103,000 acres, to-wit, 27,000 in District 8 and 76,000 in District 2, which is 2.13 acre feet per acre of so-called original water. My testimony in the Wyoming-Colorado case in respect to the duty of original water

in the Poudre valley was .9 of one acre foot per acre. That is the same method I employed in the Wyoming case, except that I deducted the amount flowing out of the district. The Platte is a natural stream, comes out of the same mountains as the Poudre, passes over the same kind of country, but has more tributaries than the Poudre. The more tributary streams there are, the more additional water comes in for use, in addition to that which originates at the canon.

The acreage in District No. 3 is 265,000. The actual flow out of Poudre canon is in acre feet 320,000; making a duty there of so-called original water of 1.2 acre feet per acre, assuming that all of it is applied in District No. 3. In that district there are no tributaries of any moment, while in Districts 2 and 8 there are important tributaries.

As to Exhibit 30, showing my estimate of possible storages at Lake Cheesman, on the assumption that the demands at Platte Canon are to be satisfied before any storage can occur, are such as indicated on the last sheet of Exhibit 35.

1902, February. No records of stream flow at South Platte for that month. Flow estimated by an inspection of flow at Cheesman. Assumed flow in North Fork to be low because it was low in South Fork. The North Fork supplies perhaps 55% and the South Fork 45% of the total discharge, but there is no regularity in the relation between the respective flows for the two forks month by month, and there is a wider discrepancy in the winter months. March, November and December estimated in the same way, there being no record of stream flows.

1903, January and February estimated in the same way. It is necessary to know what the flow in the main stream was in order to say positively that there could not be any storage in Cheesman in those months. Possibly I was influenced some by the fact that Cheesman in that month turned out a greater amount of water than was coming in. But they may have turned it out to keep the channel open. And I do not know whether their actual needs for city supply were greater or less than 66 second feet.

For purposes of comparison with the estimates of Mr. Anderson and Mr. Comstock, the amounts necessary to supply the Platte Canon Ditch should be treated in the same manner as they have dealt with them during the winter months.

In May, 1903, I allowed no storage, although storage actually occurred at an average rate of flow of 13 second feet, as appears
638 by Exhibit 31. I do not account for that actual storage, but under the assumptions I have made it should not have occurred. That was eleven years ago, and the requirements might not have been the same. Moreover, we are dealing with averages, and the average assumed by me covering the demands for that month may have been too high, as applied to that particular year.

Exhibit 35, sheet 2, Seepage. Figures were obtained by taking the report of the water commissioner as to the average seepage for the preceding week, not the seepage for the particular day, and thus averages were obtained.

Exhibit 30, 1903, December. The amount withdrawn from the reservoir in that month increased the stream flow, and was probably sufficient to offset any possible storages when the actual stream flow exceeded 66 second feet.

Exhibit 30, 1904, May. I allow the quantity actually stored, although the average flow at Platte Canon was 470 second feet, being less than the 500 second feet required by me. There were, however, days when the stream flow exceeded my requirements. Moreover, the quantity actually stored, if it had been allowed to flow down, would have increased the stream flow. Those circumstances possibly justified taking what was actually stored.

June, 1904. No storage allowed. My requirements at Platte canon 1000 second feet. There was actually stored at Lake Cheesman in that month 17,406 acre feet. If that had flowed down, instead of being stopped at Cheesman, it would have increased the stream flow. In that month the average flow at Platte canon was 541 second feet. There was a maximum flow approaching within 2 or 3 second feet of my requirement. If the amount detained at Cheesman had been allowed to flow down, the flow at Platte canon might have been increased on those days above my requirements, but the stream flows in June are fairly regular.

Ditch diversions are not greatly affected by rainfall, unless the rain be continuous for two or three days. I do not know what the average rainfall was in the month of May, 1904. If the rainfall was 3.24 inches it would have affected the demand of the ditches somewhat.

Notwithstanding the storage actually made and the rainfall, I believe there was no possible storage for Lake Cheesman in the month of June, 1904, upon my assumptions as to demand. The fact that Cheesman actually stored that quantity in that month does not indicate that my estimate of demand is too high. My requirement of 1000 second feet for June would produce 60,000 acre feet in
639 that month. Only 32,400 acre feet passed Platte canon in June, 1904. Under the peculiar circumstances in that particular year Lake Cheesman might have been permitted to store the quantity which it did store, even though my requirement is correct. The farmers and irrigators below were then watching, and have since watched, Lake Cheesman carefully.

By taking this Exhibit 30 and examining it month by month you will find, of course, that in some months I have allowed too much storage, and in others I have allowed too litle, but adopting the general rule of 1000 cubic feet per second as the necessities for June, I think we have shown that that was the necessity.

I examined the exhibits of Anderson and Comstock month by month, deducting therefrom when according to my estimates I thought there should not have been storage at Lake Cheesman, but adding nothing when according to my estimates and assumptions storage might have occurred in greater quantities than as specified by them. But if there was anything to add, it would be small.

Exhibit 30, 1904, July. I did not allow the storage which had actually been made of 22,672 acre feet. That storage was made at an

average rate of 36 second feet, on an average stream flow at Platte canon of only 431 second feet, and a maximum of only 1407 second feet on one day in the month. As to November and December, additions should be made to my estimates, or deductions from those of Anderson and Comstock for purposes of comparison, because of the different method of treating the requirement of the Platte Canon ditch.

Exhibit 30, 1906, April. The figure for April 25th should be 270 instead of 210. (Attention called to other errors, which witness will check and correct.)

Exhibit 30, 1907, November. No storage estimated, although the stream flow at South Platte, as shown by the records, greatly exceeded my requirement of 66 second feet. It is possible that I ought to have allowed it.

August, 1908. No storage allowed. If on August 6th the recorded stream flow at Platte canon was 740 second feet there ought to have been storage allowed.

Exhibit 30, 1910. Adding to my estimate the quantities resulting from the difference in the treatment of the Platte Canon ditch, would bring my total for the year to 49,480 acre feet, as compared with Anderson's estimate of 50,000 acre feet.

Exhibit 30, 1911, July. No storage estimated. If the records of stream flows show on certain days excesses over my requirement of 1000 second feet, I cannot say how I happened to overlook it. If the statements of stream flows as assumed in the question are cor-
640 rect, it would result in a possible storage in that month of about 5200 acre feet. I do not remember whether there was any actual storage in Lake Cheesman in July, 1911. In presenting Exhibit 31, showing actual storages at Lake Cheesman, I detached the sheet relating to the years 1910, 1911 and 1912. I have this other sheet with me, and from it there appears to have been actual storage made in Lake Cheesman in June and July, 1911. I do not think those actual storages should be included in my Exhibit 30, because that was a month when there was objection to Cheesman's having stored, and they turned the water out later. But if the stream flows were indicated in counsel's question, the addition of 5210 acre feet at least should be made to my estimate for July, 1911. In June, 1911, there was an actual storage in Lake Cheesman of about 4912 acre feet, making a total for June (4912) and July (6430) of 11,342 acre feet.

Although the records of the Water Company disclose actual storage in August, 1911, I do not think it ought to be allowed.

In October, 1911, there was an actual storage made in excess of the amount allowed in Exhibit 30. I do not think that ought to be included in the exhibit, although it was made and permitted, when the minimum flow at South Platte for that month was 92 second feet, the maximum 320 second feet and the average 144 second feet, to a total quantity of 2174 acre feet. That does not indicate that my requirement is too high for the month of October. The fact that Antero in that month of October stored 4500 acre feet makes no

difference. Water may have been turned out to satisfy demands below.

I do not mean to say that when there has been a large flow in the river in one month, or in certain weeks or on certain days in the month, which permitted storage and storage has been made, that because subsequently the river falls or the demands of the ditches increase, and therefore the stored water is used for the purpose of satisfying such demands, that those facts indicate that the storage could not have been made when it was made.

The withdrawals from a reservoir do not necessarily indicate unsatisfied demands of ditches below which would limit the right to store.

Exhibit 30, 1912, April. I estimate a possible storage of 4884 acre feet. There was in that month an actual storage of 7500 acre feet. The fact that the actual flows at Platte canon during the time that storage was accomplished were less than my average requirement does not indicate that my average requirement is too high. If the storage had not been made the stream flows would have been
641 increased. They were storing at Cheesman at a considerably greater rate than I say they had any right to do. If it be true that the records show actual storage in reservoirs in District No. 2 in April, 1912, of 6370 acre feet, I can only say that this Exhibit 30 represents the amount that could be stored in Lake Cheesman under certain assumptions. There are variations. Sometimes the demand falls below my average assumption, and on those days or in those months you can pick out cases where there is an apparent conflict. On other days I have allowed storage when as a matter of fact none could have occurred, and those things balance one another.

1912 is one of the years upon which I base my conclusions as to demand, but as I have stated, my examination of 1912 was unsatisfactory, and I did not use 1912 to the same extent that I did 1913 in making my estimates of demands and requirements of ditches.

Exhibit 30, 1912, May. There were actual storages in Lake Cheesman in that month greater in quantity than allowed by me. It is probable that those storages occurred constantly, and every day in the month. Even though it appears that those storages were made when the flow at Platte Canon was less than my requirement; though on May 11th the water commissioner of District No. 2 reported that "All reservoirs may store, as far as this district is concerned. Heavy rains, general," and although there was actually stored in District No. 2 in that month of May, 1912, 10,500 acre feet, and in Antero 1800 acre feet, in addition to what was stored in Lake Cheesman, I do not think that indicates that my estimate of requirements of ditches was too high, because, as stated before, that estimate was of an average, and not of the requirements of any particular day, or in any particular year.

As to June, 1912, the same is true, although in that month actual storage was made in Cheesman to the amount of 6900 acre feet, on days when the flow at South Platte was less than my requirements, and although in that month there was stored in District No. 2, 9290 acre feet, and in the Antero 10,200 acre feet.

Exhibit 30, 1912, August. Total should read 9694, instead of 8694.

October, 1912. I allowed 368 acre feet. More than that was actually stored. Although, in addition to what was actually stored in Cheesman, there was in that month 23,380 acre feet stored in District No. 2, nevertheless I do not think my estimate of average demand for that month is too high. 1912 was a year of very considerable precipitation, and the demand in that particular
642 year, of course, was less. Moreover, they had used a large quantity of water in the earlier months.

Exhibit 30, 1913. That is the other year upon which I based my reasoning and my conclusions as to the demand at Platte Canon. As to April, 1913, although in the first thirteen days of the month there was an actual storage at Lake Cheesman of much more than I estimated, yet my requirement for April is the average demand for the month, and the demand actually increases from the first of April on to the first of July. My estimate of requirements may be too much for the first part of April, but if so it would be too small for the latter part of the month. It is impossible to get day by day averages for the demand or requirements, because we have only weekly, or at best bi-weekly, reports from the commissioners. Such conclusions as these relative to the average requirements of ditches are not susceptible of absolutely accurate mathematical calculation. It is and must be a generalization. The data at hand must be examined with judgment, and you must apply your reason to it, and you must apply your experience.

Exhibit 30, 1913, May. Even though there was stored in District No. 2 4200 acre feet, in addition to what Cheesman actually stored, that does not indicate to my mind that my estimate of storage is too low.

October, 1913. Although in that month of October there was actually stored in District No. 2, 17,080 acre feet, and those storages were on priorities subsequent to Cheesman, that does not indicate that Cheesman might have stored all the water that was flowing in the South fork of the South Platte.

Notwithstanding all of the matters to which my attention has been called, and notwithstanding I require flows at Platte Canon which in the aggregate would furnish 220,000 acre feet at Platte Canon of so-called original water, for the irrigation of 103,000 acres, a duty of original water of 2.13 acre feet per acre, and although in the Poudre Valley, under similar circumstances, the duty of orig-nal water was found by me to be less than one acre foot per acre, nevertheless I do not think that my estimates of requirements or demands of ditches below is excessive. And this is true even though in my monograph on the Big Thompson I stated that the average use of water—that is, the average duty of the entire water supply, not the original water supply—was 1.9 acre feet per acre.

(Quotations from witness's monograph or bulletin on the Big Thompson read and admitted.)

(Exhibit A-65, transcript of testimony of John E. Field in suit of

Wyoming vs. Colorado, marked and submitted to witness for identification.)

643 My procedure in this case was as follows: First, estimated rate of flow which must exist at Platte Canon in each month in order to entitle Lake Cheesman to store at all, that estimate being set forth on the last page of Exhibit 35; second, on the basis of the foregoing assumption, estimated possible storages year by year for Lake Cheesman, shown for the years 1902 to 1913 inclusive in Exhibit 30; third, taking possible storages thus estimated, and treating Cheesman as a reservoir for irrigation purposes, then assumed annual draft of 40,000 acre feet to show the operating results, the same being set forth in Exhibit No. 32.

Exhibit 32—1905. By arithmetical error, final amount is 1000 acre feet too little. This should be corrected and the correction carried forward to April, 1906.

Exhibit 32—1906, May. Amount in reservoir should be increased by 3000 acre feet, including addition for previous errors. June. Amount in reservoir should be increased by 4000 acre feet, including addition for previous errors.

Exhibit 32—1907, March. Amount in reservoir ought to be increased by 14,000 acre feet, including previous errors.

Exhibit 32—1909. No figures for this year, because undoubtedly the reservoir could have furnished the estimated draft of 40,000 acre feet and yet have been full at the beginning of the next year.

Exhibit 32—1910, June. Amount in reservoir should be 69,064.

Exhibit 32—1911, January. Amount in reservoir should be 48,542. 1911, July. If recorded river flows in that month exceeded my requirements sufficiently to permit storage of 5210 acre feet at Lake Cheesman, that amount should be entered here; I have not checked the recorded flows.

Exhibit 32—1912, August. Possible storage should be 9694 acre feet. That correction, adding 1000 acre feet, should be carried from that point on through the rest of the exhibit.

Exhibit 32—1913, September. Possible storage should be 10,648 acre feet.

Evaporation, as treated in Exhibit 32. The deduction each year of 3000 acre feet for evaporation was without any regard to the quantity of water in the reservoir in that particular year, and was merely an average deduction, based on an estimate of the average exposed area. The exposed surface varies with the height of the reservoir, and that makes a very great difference in the amount of evaporation. I calculated the average exposed area for each month, then calculated the average for each year, and so obtained the average for the period. I have given no credit for the fact that when the reservoir is full, the appropriation has not been exhausted,

644 and water is available for storage, losses from evaporation may be made up out of the stream flow. The quantities I have considered for the purpose of ascertaining the exposed area are the quantities in the reservoir at the end of each month. During the month the reservoir rises and falls, making a difference in the exposed area. The average exposed area for each year was as follows:

1902, 672 acres; 1903, 450 acres; 1904, 179 acres; 1905, 482 acres; 1906, 623 acres; 1907, 820 acres; 1908, 712 acres; 1909, 874 acres; 1910, 718 acres; 1911, 504 acres; 1912, 513 acres; 1913, 675 acres. After that I obtained my grand average by adding up all of the months and averaging it. In arriving at my average annual loss of 3000 acre feet, I considered that there is a certain amount wasted from the reservoir for power purposes, lighting, etc., and that there is a certain amount of loss from seepage—not large I presume, but nevertheless something. All of these things are included. About 2700 or 2800 acre feet covers the evaporation.

As to the rate of evaporation, it makes some difference as what time of the year the large exposures of surface occur. I consider it entirely fair to determine an average by such a method as this and then make that deduction, even in the years when there is little if any water in the reservoir and at times when the storage is low. I consider this to be so, even though in the year 1904, for example, there was no water in the reservoir in July, August, September and October, and although in that year there was little opportunity to refill because of low stream flow. In years of large flow and full reservoir the actual evaporation is greater, because of the greater exposed surface; but the opportunity to replace the loss by evaporation is also greater, because the water is in the river and Lake Cheesman is entitled to store it. Nevertheless in such years I deduct only the average for the whole period of years, and not the actual evaporation for that particular year. Then in the lean years, when there was little water in the reservoir and slight actual evaporation in consequence, and also a low flow in the river so that it was impossible for the reservoir to replace what had been deducted for evaporation, I nevertheless deducted the average quantity for the entire period of years. I admit that that is not as accurate a method as taking the evaporation month by month.

In preparing my Exhibits 30 and 32 I made use of Mr. Comstock's tables of stream flow, corrected for Lake Cheesman storage, from about the middle of 1908. I understand that Mr. Comstock determined the storage at Cheesman by taking the difference between the inflow and the outflow as recorded. The inflow and
645 outflow from Cheesman, as a matter of fact, is gotten by surveying the height of the water in the reservoir. They did not go up there and measure that inflow and outflow every day. That automatically takes care of evaporation. Cheesman is not charged with it, which it should be. They have wasted some water there and made no account of it. They have constantly refilled the amount that has been evaporated—"given us the worst of it, in other words, all along the line." I said that the way they computed and determined the amount of water which had flowed into Lake Cheesman was by the changes in lake level, and I do not wish to depart from that statement. Thereby they have taken care of evaporation, because, instead of measuring and stating the quantity which actually flowed in, they have simply stated the change in the level of the reservoir. The quantity thus determined is the quantity which actually flowed in, less the evaporation which may have occurred. Nevertheless, I do not think that in using Comstock's figures for corrected

stream flow the actual evaporation at Lake Cheesman has been taken care of.

I do not think I have twice deducted for evaporation. I do not think that is the effect of it. I do not know that I can explain just now why not; I would like to think it over awhile.

By that method he simply accounted for the net; he has not accounted for the gross. You should take what is in the reservoir and then estimate your losses by seepage and evaporation and add it to the quantity. You would get a greater quantity.

In Exhibit 32 I took 40,000 acre feet as the basis of my annual draft because it happened to be a round number very largely, and also I could estimate that there would probably be a shortage in 1904 with that draft. 40,000 acre feet was not the largest figure that I experimented with. I roughly checked up with 50,000.

(The attention of the witness is called to the great quantities left in the reservoir at the end of each year, and the amounts wasted on assumed draft of 40,000 acre feet as shown by Exhibit 32.)

In view of these enormous percentages I could have made a draft of more than 40,000 acre feet, but if you did you would have less than your 40,000 acre feet in 1902. 1902 was an exceedingly unusual year in respect to the flow in the river. Without having the records before me, I cannot say whether it was the driest year in the history of the river.

By assuring an absolutely guaranteed supply you get a larger price for your water. As your guarantee is less you get a less price. It can be figured out where the point is that the quantity mul-
646 tiplied by the price will give the highest revenue. That is the proper place to put your annual draft. A lack of supply once in fifteen years would not affect the price a great deal, nor would a lack of supply twice in fifteen years. A lack of supply three times in fifteen years would affect the price quite considerably; I would not say how much. Assuming that the water is worth $50 an acre foot, with one shortage in twelve years, as shown on Exhibit 32, that price would not be lessened by $10 an acre foot if there were two shortages in fifteen years.

I made three reports to the former board of appraisers appointed in 1907, the first in December, 1907, the second dated January 20, 1908, and the third somewhat later. I have with me the volumes which contain my estimates and conclusions in respect to Lake Cheesman as of those dates. I then went through a somewhat similar process of determining possible storage at Lake Cheesman and gave that conclusion as to what it was. As a part of that report I presented tables upon an assumed annual draft of 45,000 acre feet. Thereupon I said, in substance, in that report (exact quotation in original transcript) that 45,000 acre feet could not be stored each year, although we are justified in taking a certain amount of risk of shortage and of occasionally asking the farmers to do with a little less than the average amount. And I further stated in that report that the maximum average which we are justified in selling is 40,000 acre feet per annum.

In that case I pursued a somewhat similar process to that pursued here; determined what I considered to be the average flow necessary

at Platte Canon before storage could be made at Lake Cheesman, in the irrigation season, and arrived at the same result here testified to, to-wit, a draft of 40,000 acre feet per annum, although upon different assumptions as to demand upon the canon. At that time I applied to said 40,000 acre feet a unit price of $40 per acre foot for supplemental supply, making a total for Lake Cheesman, as a water producing entity, of $1,600,000. At this time my unit price per acre foot for a supplemental supply is $50. Water rights have advanced in value since 1907. I have taken that into account in assigning my new price. I now testify that the value is $50 per acre foot if the water is used in July, August, September and October.

After reporting to the old board of appraisers I made no subsequent investigation of these water rights until I began to investigate for the purpose of testifying in this case. My subsequent investigations have disclosed no reason for changing my opinion as to the available quantity of water previously expressed.

647 My last report to the board of appraisers was some time in February, 1908. My conclusion was a possible storage in Lake Cheesman on the average of not to exceed 40,000 acre feet, with stream flows required at Platte Canon before any storage be permitted of the quantities specified in that report. These were the amounts estimated to be necessary to supply prior rights.

Under date of April 24, 1908, I wrote for and delivered to Mr. William E. Bates, a report entitled "Report on Storage Possibilities, South Platte River, Highline, Eagle Rock and Two Forks Reservoir Sites." Exhibit A-66 is a copy of that report. In that report I considered the water available for storage in those three reservoirs. All three of them are below Lake Cheesman. The Two Forks Reservoir is on the South Platte River below the junction of the north and south forks. The other two, the Eagle Rock and the Highline, are on the south fork of the South Platte, above the Two Forks but below Lake Cheesman. They were and are merely projected reservoirs, and have not yet been constructed.

In my report to the board of appraisers, given in February, 1908, I stated, speaking of Lake Cheesman: "We find that the maximum average which we are justified in selling is 40,000 acre feet per annum. * * * It may seem surprising that this famous reservoir's value for irrigation purposes is not in excess of its cost. * * * It has been shown in the discussion of Lake Cheesman rights that little, if any, water is available for storage on the south fork after 40,000 acre feet per year have been furnished from that reservoir, hence in further discussion of storage possibilities on the South Platte river only possible storage sites which derive their supply from the north fork will be considered. * * * From an investigation of the records of discharge of the South Platte at Deansbury, it is seen that there is available for storage purposes, after all demands of prior rights in Districts 2 and 8 have been satisfied, an average amount of approximately 16,000 acre feet per annum, which is about one-third the total storage capacity of Lake Cheesman." Deansbury is below the junction of the north and south forks, on the main stream.

In the Bates report (Exhibit A-66), on April 24, 1908, I said in substance, that we might assert with considerable confidence that a

reservoir deriving its supply from the north fork as large as Cheesman Lake was justified, and "from a study of Cheesman Lake and the run-off of the south fork, we feel justified in stating that an increase in the capacity of that reservoir is justified. The capacity of Cheesman Lake is about 80,000 acre feet, and its justified increase capacity may be sufficient to raise it to 100,000 acre feet capacity."

648 Such an increase might be justified in order to carry over water from such years as 1900 into such years as 1903 and 1904.

On my assumed draft of 40,000 acre feet, as shown by Exhibit 32, water went over the spillway in 1902, because we began that year with a full reservoir; also in 1907, 1909 and 1910, in certain months of each year.

In the Bates report (Exhibit A-66) I said, in April, 1908: "I am of the opinion that a reservoir of 80,000 acre feet is justified, on account of the north fork supply alone, and 20,000 acre feet on account of the south fork supply, or a total of 100,000 acre feet, but that beyond these figures the advisability is questionable." I had previously stated in my report to the board of appraisers, about 60 days before, that "There is available from the north fork for storage purposes, after all demands of prior rights in Districts 2 and 8 have been satisfied, an average amount of approximately 16,000 acre feet per annum." If 80,000 acre feet was justified, 16,000 certainly was. Of course I made still further investigations for the Bates report. I cannot say now just what I had in mind when I said 16,000 was the limit.

I also reported to the board of appraisers that the safe deliverable storage for Lake Cheesman was 40,000 acre feet. In that connection I submitted tables of possible storage covering the years 1900 to 1904, in only one of which, 1900, had I found a possible storage up to the capacity of the reservoir. I had also found and reported that the value of this famous reservoir was not in excess of its cost.

According to my Exhibit 30 and my testimony in this case, I have found that in the period from 1900 to 1914, inclusive, in only three years, to-wit, 1900, 1909 and 1914 could the reservoir have been filled to its capacity of 79,064 acre feet. You could increase your average storage by increasing the height of the dam, thereby getting a little more water three years out of fifteen. Whether that would justify an increase in capacity from 80,000 acre feet to 100,000 acre feet is a matter of balancing the cost with what water you get.

But my advice to Mr. Bates to build a reservoir with a capacity of 100,000 acre feet was based upon my report that he would be able to get 20,000 acre feet from the south fork. It was not a matter of enlarging Lake Cheesman, but of making an original investment in a new reservoir.

On my assumed draft of 40,000 acre feet per annum, as shown by Exhibit 32, the reservoir is full at times and water escapes over the spillway, but that, of course, is because of the smallness of the assumed draft. With a larger draft that would not have occurred.

649 In the Bates report (Exhibit A-66) on April 24, 1908, I stated that the limit to which I advised him to build his reservoir was 100,000 acre feet capacity, and that "The reason for this is that the canal priorities below require from 300 to 600 cubic feet per second; that this water will be taken from the north fork first, allowing Lake Cheesman to store the water of the south fork." Just prior to that time I had reported to the board of appraisers, as shown by my written report, that the required flows were: April 332 cubic feet per second, May 854, June 875, July 935, August 329, September 267. I do not consider those two statements irreconcilable. In the present case I state that the required flows in the same months are *are* as follows: May 500, June 1000, July 1000, August 700, September 400. There is quite a difference between my report to the board of appraisers and my statements to Mr. Bates in this regard. "I will have to look that up and see just how—I have to refresh my memory on that. I can't say now just why it was."

In this case, and also in my report to the old board of appraisers, the basis of my determination was that Cheesman could store all of the flow of the south fork whenever there was sufficient water in the main river to supply the priorities below; that is, that the north fork must be exhausted to supply those priorities before there is any demand on the south fork. According to my testimony and my exhibits in this case, after those priorities below have been satisfied there are very few occasions when there is any excess left in the north fork. That also was what I found and reported to the board of appaisers, to-wit, that after satisfying those priorities from the north fork there was only about 16,000 acre feet left. Nevertheless, sixty days later I stated in the Bates report: "I am of the opinion that a reservoir of 80,000 acre feet is justified on account of the north fork supply alone." I had not found any more supply in the north fork between the date of my report to the old board of appraisers and my report to Mr. Bates. The Bates report refers to the capacity of reservoirs, not to the average available supply, but I would not say that an 80,000 acre foot capacity in a reservoir is required to store an average supply of 16,000 acre feet.

Exhibit A-67 is a transcript of the tables submitted in my report to the old board of appraisers, and which formed the basis of my conclusions in respect to available storage in and the efficiency of Lake Cheesman.

Exhibit A-67 explained. Column 3 indicates the quantities furnished by the north fork and the south fork, respectively, to supply the canal demands. Column 5 shows the total amount
650 available for storage, not limited by the size of the reservoir, or its condition, as to whether it is at the time full or not. Column 6 states the amount withdrawn from the reservoir, under an assumption of an annual draft of 45,000 acre feet. Column 9, the deficiency, if any, under the 45,000 acre foot assumption. I do not know where I obtained the quantities set down as to flows, in column 1, for the years 1900 and 1901. I have stated in the

testimony here that there were no official records of those flows for those years.

Exhibit A-67 presents, in one set of tables, the information contained in my Exhibits 30 and 32 presented in this case. Upon a consideration of these tables, I advised the board of appraisers that the operation of the lake at an annual draft of 40,000 acre feet was the best that could be done, and applied a unit price of $40 per acre foot to that quantity, making a total of $1,600,000 for the Lake Cheesman property.

The board of appraisers had this matter under advisement until March, 1909, but I never advised that board of any change in my conclusions as the same were presented in said written report to them.

I advised the board of appraisers, and it was my opinion, that after satisfying priorities in Districts 2 and 8, 16,000 acre feet on the average was all that could be obtained for storage from the north fork, and that after 40,000 acre feet per year has been furnished from Lake Cheesman little, if any, water is available for storage from the south fork. Notwithstanding that, I advised Mr. Bates to build a reservoir, having a capacity of 100,000 acre feet, to catch the storage waters available in the north fork and south fork, subsequent in point of time, and therefore taking water only after Lake Cheesman's priority was satisfied, and to expend therefor the sum of $1,295,000. I concluded, and advised Mr. Bates, that a reservoir with a capacity of 100,000 acre feet, built at the location proposed, and at the cost mentioned above, and dependent for its supply of storage waters solely upon the waters of the north fork and the south fork of the South Platte, would store and deliver annually 50,000 acre feet. That was the statement in my report to Mr. Bates. The report was written to determine the relative merits of these three reservoirs mentioned herein. I made the assumption of an annual storage of 50% of the capacity. I found that Cheesman, on a similar stream, could deliver about fifty per cent, and possibly I had that in mind, and on that assumption of 50,000 acre feet I stated in the Bates report: "The revenue derivable from the conservation of 50,000 acre feet of water is at least $2,000,-
000, showing the Highline and the Eagle Rock feasible finan-
651 cially, with a probable profit in the former of $715,000 and
in the latter of $158,000, while the Two Forks would involve an actual loss of $220,000."

My judgment in April, 1908, was, as expressed in the Bates report, that, in addition to satisfying the priorities of Lake Cheesman, 10,000 acre feet per annum on the average would be furnished from the south fork, but that 20,000 acre feet could be gotten quite often. By the time the Bates report was made I had considerable more data and had studied the subject quite a bit more than when I made my reports to the old board of appraisers. But I had arrived at no different opinion, and had found no additional water available for storage in the south fork of the South Platte which I did not know of when I made my report to the old board of appraisers.

In making the Bates report I think I also took into consideration the use of Lake Cheesman for domestic purposes, and not for irrigation purposes. I think I advised Mr. Bates to make the investment of over a million and a quarter dollars for the construction of his reservoir in the hope that the Water Company would continue the use of reservoir for domestic and city supply purposes, and that in that use it would often be left full, or relatively full, so that water might flow over the spillway, and in spite of the fact that under Lake Cheesman's decree it may completely empty and completely fill its reservoir each and every year to its full capacity.

The results which I obtained and testified to in this case as to the available storage for Lake Cheesman are the same exactly in quantity as the results which I ascertained and reported to the former board of appraisers, to-wit, 40,000 acre feet per annum.

Since the date of the Bates report other rights have intervened, such as the Antero and Lost Park reservoirs, the Henrylyn and Standley Lake projects, etc. Conditions have now so changed that a recommendation at this time to build a storage reservoir of 100,000 acre feet to store the waters of the South Platte would not be justified.

According to the facts set forth in Exhibit A-67 and reported to the old board of appraisers, even if Lake Cheesman had had a capacity of 100,000 acre feet, instead of 80,000 acre feet, it could have made an increased storage only in the year 1900, which distributed over the five year period, 1900 to 1904, shown in Exhibit A-67, would have increased the average by 4,000 acre feet only. According to the facts set forth in my Exhibit 30, if Cheesman had had a capacity of 100,000, instead of 80,000 acre feet, it could have got an additional 20,000 acre feet in 1900, and after that, for the period 1900 to 1913 inclusive, some additional quantity, on account of additional capacity, only in the year 1909, making an addition
652 to the average available storage for that period, limited by the capacity of the reservoir, of only about 2,000 acre feet annually. But upon an assumed annual draft of 40,000 acre feet, as shown by Exhibit 32, the result would have been different.

The amount left in the reservoir at the end of each year depends upon the draft placed upon the reservoir. As the draft is increased the amount carried over in the reservoir is decreased. Disregarding the assumed annual draft, it is true that in the whole period 1900 to 1913, inclusive, according to my estimates here made and as presented to the old board of appraisers, the total quantity of water available for storage in Lake Cheesman exceeded the capacity of the reservoir only in the years 1900 and 1909.

(Exhibit A-66, the Bates report, admitted over objection and exception.)

(Exhibit A-67, transcript of tables presented to old board of appraisers, admitted.)

(Exhibit A-65, transcript of Mr. Field's testimony in Wyoming vs. Colorado, admitted over objection and exception.)

Suggested corrections in Exhibits 30 and 32 reviewed. Will not admit correction for 1911.

Letters of Cogswell, Division Engineer, referred to to show that the actual storages were improperly made.

I do not think the records showing the amount of water at Lake Cheesman, the inflow and the amount stored during June and July, are correct. If they were incorrect, then Mr. Comstock's corrected stream flow, based thereon, would be incorrect. Therefore, because of uncertainty, I have allowed no storage in June and July, 1911. My construction of division engineer's orders is that there was a practical prohibition against storage in Lake Cheesman from June 1st until the end of the year 1911. If you deduct all the water actually ordered by the division engineer to be turned out, there would still remain approximately 14,000 acre feet of actual storage made in 1911 and permitted to be made; but my further theory is that there existed from June 1st to the end of the season a continuous prohibition against storage, and therefore there should be deducted any additional quantities stored during that period.

Further explanation of changes to be made in Exhibits 30 and 32. Will present amended exhibits.

The assumed annual draft of 40,000 acre feet may not be the draft upon which it should be operated for irrigation purposes. It might be that a draft of 50,000 acre feet would be advisable; but if you assume a draft of 40,000 acre feet, you get a better price per unit. If you assume a draft of 50,000 acre feet you get a less price per unit, but the gross result is about the same. On a 50,000 acre foot draft the unit price applicable would be $40 per acre
653 foot. The difference in efficiency between a 40,000 and a 50,000 acre foot draft, under my estimates, would make a difference in price per acre foot of $10. The amount of shortage below the assumed supply, in each of the years when a shortage occurs, must be considered. Assuming that shortages occur in three years out of a period of 13 or 14, such shortages must amount to as much as 50% in each of the three years to justify a reduction in the unit price from $50 per acre foot to $40 per acre foot. I mean by that the average shortage for the three years. In the period here estimated is included the year 1902, a year of exceedingly short supply, producing a shortage very much greater than in the other two years where shortages occurred.

I experimented somewhat with a 50,000 acre foot draft, and found shortages after the year 1904 in the years 1910 and 1911, but I don't remember just how the deficiencies came out. This is a matter more of experience than judgment. I do not know that I can reduce it to a mathematical calculation. I want to say right now that on a 50,000 acre foot draft $40 per acre foot is my opinion of what the value of the water is, and on a 40,000 acre foot draft the value of the water is $50 per acre foot. I have not actually made a table upon an assumed draft of 50,000 acre feet, and do not know just what the shortages or the percentages of shortage would be. When I amend my exhibits I will present such a table.

I know of no large reservoir in this neighborhood that has no shortages in the like period of fourteen years. They have all had them. I think it would be uneconomical to operate a reservoir and

not have an occasional partial shortage. I do not know of any reservoir on this side of the range in Colorado which has not had a shortage in its contracted supply in the last fourteen years.

My exhibit 32, on an assumed draft of 40,000 acre feet, shows a deficiency in one year only, to-wit, 1904, in the period 1902 to 1913 inclusive. If I had included the years 1899, 1900, 1901 and 1914, there still would have been a shortage only in the one year, 1904. If the assumed annual draft had been 50,000 acre feet during that same period of fifteen years, shortages would have occurred in my opinion, in three years.

In my report to the old board of appraisers I stated with respect to the years prior to 1900 that there were no records pertaining thereto which were sufficient to be of service.

I now assign a price of $50 per acre foot for a supplemental supply. In 1907 I assigned a unit price of $40 per acre foot for a supplemental supply.

The value of group 1, Platte Canon rights, Bear Creek rights and Lake Marston. I now assign to the summer flow of the
654 Platte Canon ditch a unit price of $4,000 per second foot.

In my report to the old board of appraisers I assigned a unit value thereto of $2,000 per second foot. Since 1907 there has been an increase in the value of direct flow rights, but not to that extent. Under normal conditions, both land and water would be more valuable now than in 1907. The demand for water is greater than in 1907, and, the quantity being limited, the greater the demand the higher the price.

As to the winter flow of Platte Canon ditch, I reduced that from 56 to 50 cubic feet per second and assumed that it might be stored in Lake Marston. I made that reduction because, as stated in my direct examination, certain persons have a right, as against the Water Company, to receive water for irrigation from the Platte Canon ditch. If it should be wrong in making that deduction from the winter flow, as well as in the summer, the additional 6 second feet flow during the winter season would afford 1800 acre feet. 56 second feet flowing during the non-irrigation season would produce approximately 16,912 acre feet. Of this I assume that 14,000 acre feet would be stored in Lake Marston. I made a rough assumption that the river would not furnish the full quantity of 16,912, and therefore took 14,000 acre feet. I did not go into details as to that. To that 14,000 acre feet, and to the water coming into Marston Lake from the Bear Creek source, I assigned a value of $40 per acre foot. I assigned a different value to the product of the Platte Canon ditch during the irrigation season because there was no stored water. You must use direct flow water when it is flowing. If Lake Marston could be so operated in connection with the Platte Canon ditch that the product thereof in the irrigation season is deliverable like storage waters, you could get a higher price for that. But I do not see why merely running water through a reservoir should increase its price.

Except for Lake Cheesman, the Bear Creek rights and a portion of the winter flow of the Platte Canon ditch, which I deemed storable in Lake Marston, all of which I valued on an acre foot basis, the

remaining water rights of the company were valued by me on a second foot basis. Second foot is an expression of the rate of flow, rather than of quantity. Value of second foot rights in different ditches — likely to differ greatly, although ditches be close together and taking their water from the same stream; for example, the Highline ditch and the Platte Canon ditch. A second foot right depends for its value on the quantity of water which it will furnish, and also upon the time of the year when the water is furnished. A certain quantity of water under a second foot right furnished during the months of July, August and September would be worth more than the same quantity of water furnished under a second
655 foot right during the months of May and June, although both rights were reliable. In the case of the Platte Canon ditch, which furnishes a constant flow throughout the irrigation season, the water furnished under that constant flow during the later months of the irrigation season is worth more than the water furnished thereby at other parts of the year. Even under such a constant flow, the water furnished by the direct flow right in the latter part of the irrigation season, when the need is greatest, is worth less than the water furnished during those same months of the irrigation season which has been stored in a reservoir and held until that time, because with stored water you are able to conserve it, even for a day, or two or three days, and then turn it on in almost any volume that your necessities, convenience, economy of use and operation dictate. You can shut it off on Sundays and holidays, and when there are copious and continued rains, thus adjusting your use of the reservoir water to reach the greatest economy. This you cannot do with a direct flow right, even one as old and reliable and constant in flow as the Platte Canon ditch. Even though you had an equalizing basin to equalize the direct flow, it would not be worth as much as stored water, because the stored water could be used at any time of year. The beauty of reservoir water is that, you have it absolutely under your control, you can vary it in volume and you can vary it in time. You can often carry the reservoir water over into the next year, while with a small regulating reservoir you cannot. You can actually go out and purchase these direct flow rights for less than you can the reservoir rights, and it is the market value, of course, on which I would base by judgment. Those are the direct flow rights usable directly out of the ditch, and dependent upon the vagaries of the stream and the flow of the ditch as to when the water can be used.

In valuing group No. 1 I included the Platte Canon filter galleries, item No. 8, to which I subsequently gave a separate value of $38,252. This should be deducted from group No. 1, leaving a value for that group of something less than one million dollars. Deducting the structure values, a considerable deficiency appeared.

As to items 5 and 6, the Mississippi Street galleries, I applied my unit price per second foot to the actual diversions that had been made by the galleries, to-wit, $1500 per second foot for the summer flow, $1100 per second foot for the winter flow, considered as five-sevenths of the summer flow, making a total of $26,000.

I cannot imagine a situation when the city of Denver would be actually without any water supply at all, and if it were obtaining a water supply from sources other than The Denver Union Water Company, there would be the same return flow into the
656 stream from the sewage. But if the city took its water supply from new sources, it might be able to dispose of the sewage as it pleased, because there would be no accrued rights to the return from that particular water. That might be true if the city brought the water across the range, or obtained it in South Park. If the city bought rights on the South Platte river now devoted to irrigation purposes and changed them to a domestic use, of course the demands for irrigation purposes would to that extent be diminished.

The total value on items 5 and 6, Mississippi Street galleries, found by me was $26,000. Values have increased since 1907. Nevertheless, to these same rights I assigned a value of $33,000 in my report to the old board of appraisers. I have applied my unit prices to the actual quantities diverted, and not to the capacity to divert.

Item No. 7, Cherry Creek galleries. My present value, $10,000 gross, same value assigned in report to board of appraisers in 1908.

Item No. 8, Platte Canon galleries. Present valuation $38,252; in report to board of appraisers in 1908 $1,238. In making my estimate of storage in Lake Cheesman I had assumed that this right would flow constantly at the rate of 10 second feet, therefore in valuing this right, to be consistent, I have to make the same assumption, and so valued it at $4,000 per second foot.

Items 9 and 10, the two Platte Canon conduits. Adopted Mr. Anderson's valuation. In 1908, in report to the board of appraisers, I valued item 9 at $2,475. I now value it at $24,750. This time I took a quantity of 24.75 cubic feet per second and applied to it a unit price of $1,000; on the former occasion I took the same quantity and applied a unit price of $100 per second foot. I have changed my mind about it since 1908. As to item 10, the other conduit right, I valued it at this time at $30,464; in 1908 I valued it at $100 per second foot for 38.08 second feet, making $3,808. The same explanation as before.

As to item 20, Lake Archer power right, and 21, Rough and Ready power right, I have not upon this occasion placed any value upon them. I have left them out because of an assumption I made that they should not be included in a value for rate making purposes. Item 22, power right of the Platte-Denver ditch, I omitted for the same reason. In 1908, in my first report, I assigned to the Lake Archer power right, item No. 20, a value of over $190,000, which I reduced in my supplemental report to $32,600. This time I have left it out entirely. As to item 21, Rough and Ready power right, in 1908 I valued that at a total of $63,270; this time I have omitted it entirely.

657 From the total value of Lake Cheesman as found by me I deducted structure values as found by Metcalf and Anderson. Deducting these left a net value, on the basis of $50 per acre foot, of $573,223, or on the basis of $40 per acre foot, of $173,223.

It may be that the structures are valued too high, or that the character of the structures is not justified when the water is used for irrigation purposes. In my report to the board of appraisers I stated, after determining a total value for Lake Cheesman of $1,600,000, "It may seem surprising that this famous reservoir's value for irrigation purposes is not in excess of its cost." It may also seem strange at this time that for irrigation purposes this "famous" reservoir is not worth more than the sums mentioned above in excess of its cost.

As to all of the other water rights of the Water Company, considered as entities, I have in each instance determined that the value of the entity for irrigation purposes was less than the reproduction cost of the structures appurtenant thereto. This character of structure for irrigation purposes is not the correct character of structure, nor what would be built for such purposes. I found some deficits to exist in respect to each water producing property except Lake Cheesman, the two Platte Canon conduits and the Highline ditch rights. But in respect to the other water rights I found a sufficient deficit so that deducting these deficits a net water right value on the entire plant was found of $429,189. If such a deficit is found as to a particular right, I do not think the Water Company owes that money to anyone. If a man has one water right which is worth less than nothing for irrigation purposes, that does not mean that other good water rights which he has are worthless by reason of that fact. I simply presented those figures for the information of the court. He will exercise his judgment as to whether this deficit is to be deducted or not. In valuing this plant as a whole I think really it would have to be deducted as I have done in that respect. In 1908 I found such a deficit to exist, even in respect to Lake Cheesman.

My estimates here have been of a valuation of these water rights for irrigation purposes. For irrigation purposes different and less expensive structures would have been provided. The structures as they exist were fully justified considering the use to which the water was to be applied, namely, domestic, municipal or city supply uses. When you sell your water for domestic purposes you get interest on the value of your water rights, pure and simple, as such; you also get interest on your structures as such, and the combined revenue justifies the acquisition of the water and also the construction
658 of the plant. Whether in that view of the case any deduction should be made from water right values because of structures is a question I am not prepared to discuss The owners and projectors of these water works are entitled to have a greater value because of these expensive structures than if the water rights were devoted to irrigation purposes. But I do not think the water itself has a higher value because used for domestic purposes. In my report to the board of appraisers in 1908 I said: "It may be argued that water for domestic and municipal purpose has a higher value than obtains for agricultural use, and this is true." Nevertheless, the value of the water right is based upon its value for agricultural purposes. A city can afford to pay more for its water than a farmer can, and therefore it is true that for municipal purposes it has a

higher value. The water right itself might be purchased at its value for irrigation purposes, but it costs more after you have it to develop it for city use than it does to develop it for irrigation purposes, because of the difference in the cost of the structures. The owner of an adequate water right which he is devoting, together with the structures which have developed it, to the supply of a city, is entitled to get a return, first, upon the agricultural value of the water right, second, upon the value of the structures which he has been required to install for the purpose of making it available for city use, or upon the aggregate of the two. The value of the water right for irrigation purposes might be taken and an average or normal amount deducted for the value of the average or normal irrigation structures. The average or normal irrigation structures would, except possibly in the case of Lake Cheesman, cost considerably less than the expensive water works structures here existing.

Redirect examination:

Exhibit 30 was present for the purpose of estimating what might be expected in the future. My estimate presented to the old board of appraisers was on a purchase basis. In the Bates report I considered the future of Lake Cheesman on the basis of domestic use. (Objected to as being in conflict with the language of the Bates report. Overruled, Exception.)

There was a conflict in the United States' land office relating to the rights of way for these three reservoirs, and the Bates report was written to determine the relative merits of the three sites for irrigation purposes.

My Exhibit 30 was prepared without any reference whatever to the criticisms I had made of the testimony of Mr. Comstock
659 and Mr. Anderson and their exhibits. That criticism was an entirely different and distinct matter.

In the case of Mr. Anderson, the percentage of error, based upon gross figures of allowance and gross figures of error, was 29.4%.

As to Exhibit 35, the deductions made on the last page to reach the final amount, measured in acre feet, aggregated ten per cent. Applying a ten per cent reduction to the figures above relating to Districts 8 and 2 respectively, there remains as the final amount for District 8 104,700 acre feet, and for District 2 115,767 acre feet.

The average storage as shown originally by Exhibit 30 was 48,380 acre feet. Making the corrections admitted, except for the year 1911, would add 400 acre feet to the average. If the correction suggested for 1911 were made it would add another 400 acre feet, making a total of 800 acre feet.

The accretions to the steam in Districts 8 and 2 are not available to ditches in the upper ends of the districts. The Highline must get practically all of its water from the canon, except accretions where it crosses Plum Creek; and the Burlington, at the head of District 2, receives the accretions from the Denver sewage.

If ditches on streams tributary to District 2 were shut down and the water allowed to flow into the main stream, the Burlington would be benefited, even though the water entered District No. 2

below its intake, because the needs of other ditches below would be supplied and demand on the stream flow at the Burlington intake decreased. But this would be quite remote.

The private marks, mentioned in cross examination, by which water commissioners estimate the flow in ditches, are pegs driven in the bank of the ditch, or points on the pier of a bridge, etc. He places these where they can be seen from the road as he drives along. The water commissioners and their deputies go by these private marks to quite an extent.

When Mr. Anderson and Mr. Comstock assumed that a portion of the yield of the Platte Canon ditch could be stored in Lake Cheesman it was an assumption of a right to convert a direct flow right into a storage right. It really involves a change of the point of diversion.

The year 1912 did not produce a full reservoir at Lake Cheesman, according to my Exhibit 30, which represents my best judgment in the matter.

The object of my testimony in the Wyoming-Colorado case was to show that if water were diverted from the Laramie into the Poudre a great benefit would accrue to the district, to the state, and to the public generally. I endeavored to show what that
660 water would accomplish in the Poudre valley, including its use and re-use.

According to the 16th Biennial Report of the State Engineer, covering the years 1911 and 1912, average duties of water for the year 1912 are shown as follows: District No. 3, 1.98 acre feet per acre; District 4, 1.85 acre feet per acre; District 5, 1.76 acre feet per acre; District 6, I did not average; District 7, 1.6 acre feet per acre; District 9, 3 acre feet per acre. I think District 9 is most nearly comparable with District No. 8 in respect to the character of the soil and character of crops raised, although a large part of District 9 is adobe. I think District 1 more nearly compares with District 2 than any other, and also with District No. 8. I do not know what the average diversion in District No. 1 has been, but individual diversions for the year 1912 were as follows: (List of individual diversions given.)

Applying a method similar to that used by me in the Wyoming-Colorado case, I found a consumptive use of water in District No. 8 of about ¾ of an acre foot per acre, showing that the return to the river from the use of these waters is very large. The physical conditions for the re-use of water in District No. 8, on the Platte, are not so good as on the Poudre. The water coming back into District No. 8 is re-used in District No. 2

The duty of water is ordinarily determined at the headgate of the ditch, or if reservoir water, at the reservoir. This duty differs from the amount of water applied to the land, because of the losses in transit. The amount diverted by ditches is measured at the headgate. The demand of the several ditches is considered at the headgate.

I did not examine the tables prepared by me for the old board of

appraisers in preparing for my testimony in this case, but the ultimate result is practically the same.

(Exhibit A-67 compared with Exhibits 30 and 32.)

As to the apparent conflict between my report to the board of appraisers in relation to the supply and my report to Mr. Bates, I believe that I have explained that about as fully as I can. There is nothing further that I want to say upon that subject. In making up the Bates report, I was considering only the comparison between the reservoir mentioned.

In considering the value of the Platte Canon ditch right, I also considered that the Rough and Ready power right was of benefit, in that, being in the same ownership, it would not interfere with the Platte Canon ditch right, and therefore made the Platte Canon ditch right a better right.

In this case I have considered the water rights of The Denver Union Water Company upon the same basis as when I made
661 my report to the former board of appraisers. Of course in this case, being for rate-making purposes, I left out certain rights which appeared not to be involved in a rate-making case.

The rainfall along the foothills to the west of Denver in Districts 3, 4, 5, 6, 7 and 9 is greater than it is east of the Platte river and in the immediate vicinity of Denver. There is somewhat less rainfall in Districts 2 and 8 than in the other districts mentioned.

Recross-examination:

Mr. Fellows cooperated with me in the preparation of the reports filed with the old board of appraisers. The Bates report, Exhibit A-66, was my own individual production. Mr. Fellows did not cooperate with me in that, but I think he had knowledge of it at the time. I might even have consulted him; I do not remember. There has been a copy of it on file in the office since that time.

There was no difference in the principles of valuation applied by me in my report to the board of appraisers and in my present testimony. In the present instance I left out some of the property that I thought was not used or useful, or reasonably necessary to use for the city's supply.

I think the Bates report, Exhibit A-66, was based upon a theory, which I then had in mind, that Lake Cheesman was then and would always thereafter continue to be a reservoir for domestic and city supply uses. I think I must have had that in mind. It is a long time ago to have any definite recollection on the subject. Whether I had that idea in mind then or not, it would not make a very great difference in the conclusions which I might draw in my report to Mr. Bates. I cannot say positively that in preparing the Bates report, and in estimating possible storages for the Highline, Eagle Rock and Two Forks reservoirs, I assumed that Lake Cheesman would continue to be used for domestic and city supply purposes. I have not the notes, or anything of that kind, and cannot say positively.

In the Bates report I recommended the same additional reservoir capacity for the south fork, whether it should be by way of addi-

tion to Lake Cheesman itself or in the new reservoir to be built by Mr. Bates and used for irrigation purposes. In the Bates report, in ascertaining how much was left in the way of reservoir capacity justified for irrigation purposes, I estimated a total justified reservoir capacity for both the north and south forks of 180,000 acre feet, from which I deducted the total capacity of Lake Cheesman; nevertheless, I do not think that I was necessarily dealing with
662 Lake Cheesman upon the same basis as I was dealing with the reservoir which Bates proposed to consrtuct. We were dealing in averages. I am, nevertheless, of the opinion that I based that report upon a consideration of Lake Cheesman solely as a reservoir for domestic supply.

In respect to the efficiency of Lake Cheesman and the quantities which it may store, I have in this case arrived at practically the same figure determined and reported by me to the old board of appraisers.

On re-direct examination I stated that Anderson's percentage of error was 29.5. That was a mistake; it was 24%. That percentage was determined by consideration of the years 1909 to 1913, as shown by Mr. Anderson's Exhibit A-32, by deducting therefrom when according to my assumption deductions should be made, but adding nothing thereto when according to my assumptions Mr. Anderson's estimates were too low.

The percentage in respect to Comstock was determined with respect to the same years and in the same manner as that relating to Anderson.

No such percentages would have been obtained if I had compared the figures of Anderson and Comstock with those contained in my own Exhibit 30.

As to my Exhibit 35, last page: the deductions made by me amounted in the aggregate to ten per cent, but month by month they were as follows: April 10%, May 2%, June 15%, July 14%, August 5%, September 8%, October 10%.

There are large accretions to the river in District No. 8, and their effect begins to be felt above the head of the City ditch, which is the ditch of the Platte Water Company. All the ditches in District 8, except the Highline and the Last Chance, are below that point and would receive the benefit of the return flow in District 8. The seepage and return flow in District No. 8 is also available to the ditches in District No. 2, even those at the very head of that District, including the Burlington. Moreover, the Burlington has the benefit of the inflow from Cherry Creek, and the inflow from the Denver sewers, which is always large and quite constant. In preparing my Exhibits 35 and 30 I deducted all of the seepage and inflow in District 8, as estimated by me, from the demands of District 2 upon the flow at Denver.

The shutting off of the ditches in districts tributary to District 2 would increase the supply of the Burlington, even though the tributary streams entered the main stream below the Burlington intake, by decreasing the demand of the lower ditches in District 2
663 upon the stream flow at the headgate of the Burlington.

The private marks of the water commissioners further described.

When a ditch is drawing reservoir water, it is the duty of the water commissioner to report that fact, and in my Exhibits 33, 34 and 35 I have intended to show such fact whenever it appears in the water commissioners' reports. Sometimes reservoir water is transferred through the river from one reservoir to another.

On my re-direct examination I omitted to give the average duty of water for the year 1912 in District No. 6. It now appears that that average duty was 1.03 acre feet per acre per annum. That is a higher duty and a greater accomplishmerft by the same quantity of water than in any of the districts which I did mention on re-direct examination.

There may be some duplication of acreage in determining these water duties. I do not know to what extent. I would not say to a large extent.

As to District 9, the Arnett ditch and the 2800 acres under it, which I omitted: That ditch is otherwise known as the Harriman ditch, and its diversions consist not only of diversions to irrigate said 2800 acres, but also to supply the city and county of Denver. That is the ditch which furnishes Marston Lake, and therefore, of course, should not be included in determining the duty of water for irrigation purposes. I did not mention this fact on my re-direct examination.

In Exhibit A-67, the tables presented by me to the old board of appraisers, I calculated and deducted evaporation for each month. In Exhibit 32 I deducted the constant quantity of 3000 acre feet each and every year, as an average amount. The more correct and logical method is to determine and deduct each month. I do not know what result I would have arrived at if I had used that method in respect to Exhibit A-32. I will review the evaporation in that way when I present my amended exhibits.

Aside from evaporation, I do not think the losses from Lake Cheesman are a matter of any considerable consequence. Exhibit A-67 presents all of the tables which I presented to the old board of appraisers upon this subject.

Records of precipitation in Districts 3, 4, 5, 6 and 7, as compared with Districts 8 and 2, discussed.

Redirect examination:

Exhibit 36 *are* copies of letters of the division engineer relating to storage in the summer of 1911, and referred to in my cross examination. (Exhibit 36 admitted.)

664 Recross-examination:

Exhibit 36 contains all of the letters written between June 19th and December 3rd, both dates inclusive, relative to the storage of water in Lake Cheesman or in Antero.

Redirect examination:

Exhibit 45 is a corrected exhibit, embodying certain corrections in my original estimate of Lake Cheesman upon the assumption of a 40,000 acre foot draft, and also an estimate on the assumption of a

50,000 acre foot draft. The last sheet of Exhibit 45 also shows the precipitation at the different stations. The evaporation has been deducted each month; the evaporation determined for each month being shown on page 1. (Exhibit 45 admitted.)

Exhibit 46, consisting of five sheets, marked pages 2, 4, 5, 6 and 7, are sheets bearing corrections necessary on account of errors appearing upon sheets with corresponding numbers in Exhibit 45. They are to be substituted for the original sheets. (Exhibit 46 admitted.)

Recross-examination:

The corrections made by Exhibit 46 relate to errors in Exhibit 45, in the calculation of evaporation. For instance, in January, February, March and April of 1902, no evaporation should have been deducted, because in those months the reservoir was full, and there were additional quantities in the river available for storage under the appropriation. So long as the reservoir has not exhausted its right to store in any particular year, by having taken from the river in total quantity 79,064 acre feet, according to the method I have here employed, it is entitled to take available storage water to fill up a vacancy in the reservoir, even though it be caused by evaporation. I have so treated that matter throughout these tables in Exhibit 45, as corrected by Exhibit 46. The other sheets in Exhibit 46 make similar corrections.

In computing evaporation, I applied my factor of evaporation to the stage of the reservoir as it existed on the first day of the month that I was considering, and not to the average area for that month. The rate of evaporation varies with the different months. I might have got more accurate results if I had taken the average exposed area for each month.

According to Exhibit 46, there was a full reservoir in certain months in 1908, notably March and April; also in September, 1909, and in January, February, March and April, 1910. Nevertheless, quantities of evaporation are set down opposite these months. These
665 quantities ought to be deducted from the total of evaporation, appearing at the foot of the column.

Exhibit 46, sheet 6—January, February, March and April 1910; there being a full reservoir and available storage, the quantities of evaporation should be eliminated from the evaporation column, and the aggregate of those figures deducted from the total at the foot of that column.

Exhibit 45, as amended by Exhibit 46, in its first part, covers my assumed draft of 40,000 acre feet and the operation of the reservoir under that assumption, following which is a table upon an assumed draft of 50,000 acre feet. As to the 40,000 acre foot draft, it is identical with Exhibit 32, except that evaporation has been dealt with month by month.

The evaporation factors applied in Exhibit 45 and shown on table 1 were obtained as follows: From Wilson's Irrigation Engineering I took the data for the evaporation at Denver and at Colorado Springs, and took something of an average between the two. I think the evaporation at Cheesman would be somewhat less than the aver-

age of those two, but considering the matter of wastage and seepage from the reservoir, I thought the average was fair. The quantity which I took as the vertical loss in each month, as shown on page 1 of Exhibit 45, was not the average of the quantities given by Wilson for Denver and Colorado Springs. I have made no experiments to ascertain what is the actual loss by evaporation at Lake Cheesman. The figures on page 1 of Exhibit 45 as to the respective months are sometimes more and sometimes less than the average of the figures for Denver and Colorado Springs as given by Wilson.

I examined the evaporation at Cheyenne and other places and that influenced my judgment somewhat. Evaporation at Cheyenne is a great deal more rapid than at Cheesman, because of the wind, and because it is on the plains. I also examined the evaporation at some other places, like Santa Fe. The evaporation from Lake Cheesman is less than from a shallower body of water. The depth of the lake tends to keep the water cool. The rate of evaporation at Lake Cheesman would be less than at Fort Collins.

There is an agricultural experiment station, at the agricultural college, at Fort Collins. I have seen their Bulletin 45 on the subject of evaporation. I did not know that the average annual loss from evaporation on a tank placed near Fort Collins, at an elevation of 4990 feet, was shown to be 3.4 feet. The average annual evaporation computed by me for Lake Cheesman, as appears in Exhibit 45, page 1, is 5.25 feet. But that covers all other losses. I cannot say what the other losses amount to. I did not consider precipitation at Lake Cheesman in determining loss by evaporation. The
666 precipitation probably belongs to the river, therefore I have made no deduction from evaporation on account of precipitation.

Said Bulletin 45, issued by the agricultural experiment station, states, as to said evaporation loss of 3.4 feet: "The amount given as the evaporation is the loss from the water surface after allowing for the rainfall, or is the fall of the surface plus the rainfall." If said Bulletin 45 states that the annual loss of 3.4 feet is the gross loss by evaporation, without deducting anything from it at all on account of precip-tation, I think the experiments must have been wrong. My theory is that the water which comes from the clouds and falls on the surface of the lake is water which if the lake were not there would belong to the appropriators below—that is, whatever reached the river, or in the order of its priority would belong to the lake itself; but to say that Lake Cheesman had, whenever there is a rainfall, to let out of the lake whatever has fallen on it is cutting it entirely too fine. If the lake were not there, not all of the water which now falls on the surface by way of precipitation would reach the river. A third of it might. Therefore, I am willing to admit that two-thirds of the precipitation ought to be deducted from the gross evaporation.

The gross evaporation loss at Lake Cheesman is approximately 5 feet vertically; the gross loss on account of other losses is at least a foot and a quarter, making a gross vertical loss of six and a quarter feet. From that 15 inches may be deducted for precipitation. For the purpose of getting past this question, I have assumed that the

evaporation there is approximately five feet; that the precipitation is about a foot and a quarter; that the losses from sources other than evaporation are approximately equal to the precipitation. That is what I have done. I made those assumptions without and investigation. I do not know what the losses from the reservoir are, and I do not know that the precipitation exactly, or even approximately, equals such losses. The losses from the Two Buttes reservoir, on the plains in Southeastern Colorado, are approximately that. That reservoir is retained by an earthen dam about 80 feet high, and has a capacity of about 50,000 acre feet. This is the first year that it has been filled. In the course of three weeks the loss from the surface of the Two Buttes reservoir was nearly two feet. It is well known that a reservoir on the plains, retained by an earthen dam, and particularly in the earlier years of its life, is subject to very much greater losses from seepage and other like causes than a reservoir like Lake Cheesman. There are no evidences of any leaking through the granite bed of Lake Cheesman that I know of.

I do not want to be committed to saying that one and a quarter feet is an accurate statement of the annual losses from Lake
667 Cheesman on account of causes other than evaporation. I really intended to give credit to Lake Cheesman for the amount of precipitation, but regarded it as being offset by the losses from the lake otherwise than by evaporation. All of the precipitation falling on the lake surface should not be credited to the lake. I took this into consideration. I think I deducted enough on account of precipitation to balance the losses from other causes than evaporation, which losses, for purposes of illustration, I assumed were one and a quarter feet vertical per annum. If there be any loss by seepage from Cheesman, I would say that it does not reappear in the stream before the intake of the Highline ditch is reached. If there is any wastage other than seepage, it immediately reappears in the stream, being discharged into the stream immediately below the dam.

Exhibits 45 and 46 further explained. Exhibit 45, last page relates to precipitation. It pertains to the inquiry which arose in respect to the relative average rainfall in Districts 8 and 2, as compared with Districts 3, 4, 5, 6, 7 and 9. The table shows that the average precipitation on a meridian running through Cheyenne, Greeley and Denver is less than the average precitation on a meridian to the West running through Boulder, Longmont, Loveland and Fort Collins, just at the westerly edge of the districts. Instead of taking the precipitation at Loveland I took it at Boothroyd's ranch at Waterville. That ranch is to the West of Loveland, in the foothills, and inside of the Big Thompson canon. There are official records of the precipitation at Loveland proper. They are official records, and show a considerably less precipitation than appears from the records at the ranch in the foothills to the West.

I think the average of the rainfall at Greeley and Fort Collins ought to fairly represent the average of District 3. That average is less than the average rainfall at Denver. The average of Denver and Greeley would fairly represent District No. 2. That average is

slightly less than the average of Greeley and Fort Collins, the one being 13.75 inches, the other 13.48.

The rainfall is greater in the foothills and mountains than on the plains. I never looked into the question as to what the precipitation at Lake Cheesman is. Loveland proper is about the center of District No. 4; perhaps a little West of the center. I do not claim that the average rainfall at Boulder is characteristic of District No. 6. Boulder is situated at the extreme western edge of the irrigated area in that district.

Redirect examination:

A quotation is made from Bulletin No. 45 relating to losses from reservoirs by evaporation (exact quotation in original tran-
668 script), in substance that the net loss would be the sum of the above losses from seepage and from evaporation, diminished by the rainfall, a combined loss which may be considered as a depth of six feet in one year.

Recross-examination:

Said bulletin also states: "If the loss from seepage is not more than two feet per annum, the site may be considered as practically water tight." Most of the reservoirs discussed in that paper are, of course, earth reservoirs.

Said paper also states that evaporation proceeds when the water is frozen, but at a diminished rate, averaging about one to one and a half inches per month. My factors of evaporation for the winter months, used in Exhibit 45, are higher than that.

The paper also states that the lower temperature of the water at high elevations, and the lower dew points, tend to decrease the evaporation; that the winter period is longer at the high elevations; that for the whole year the evaporation is in all probability considerably less at the high elevations than at the low ones; that evaporation is lessened by any influence which diminishes the wind or decreases the temperature of the water; that the deeper the lake the cooler the surface, consequently the less evaporation. I agree with all of those things, and that they are characteristic of Lake Cheesman, except that there is generally a fresh breeze up and down the canon.

Redirect examination:

I have no idea that Lake Cheesman is frozen over in November and December of every year, and in January and February and March. Large bodies of water maintain higher and more stable temperatures in winter than small bodies of water.

GEORGE M. BULL, a witness for the defendants.

Direct examination by Mr. Nye:

Civil engineer since 1897; a graduate of Rensselaer Polytechnic College, of Troy, New York; followed his profession since that time, mostly in hydraulic work; lived in Colorado since 1906; first worked on the Erie canal, then with Chicago and Northwestern, then be-

came deputy city engineer of Troy, assistant engineer on construction of new water works for Troy, New York State Barge Canal, in charge of design of structure for the Champlain division; with J. G. White & Company, and came to Denver with that company.

669 Was chief engineer for the Denver Reservoir Irrigation Company; since then have been in general practice; in 1906 principal part of work for Denver Reservoir Irrigation Company and J. G. White was examining and reporting on different propositions on the Platte river and surrounding watersheds; collected and preserved data in connection with the work, and preserved same in permanent file.

Has since added data as the result of work with the East Denver Municipal District water supply; is generally familiar with the water system of the Denver Union Water Company, and has visited Cheesman Lake; has taken reports and data regarding storage possibilities on South Platte river, relating to conditions of irrigation at present, and has gotten out certain estimates, using records of the state engineer's office, commissioners' and state reports.

Witness prepared Exhibit 37, which is topographical map of the South Platte river in the vicinity of Denver; the notations in red were put on specially.

The general limits of irrigation districts 8, 2 and 1 are shown by the red line crossing the river. The second plat in the exhibit shows records of precipitation at Denver between 1872 and 1911, made from the records of the weather bureau, and shows departure of precipitation from the normal, in per cent.

The broken black line in the month of April is not considered; it was put on for another purpose. The next plat shows three things: the amount of storage in Lake Cheesman during each month of the years between 1900 and 1913, the average monthly flow during each month, and the time of the greatest flood volume during each month.

At the left of the diagram is a storage curve showing the elevations above the bottom of the reservoir at which various volumes of water are stored. The portion marked "storage capacity in use" shows the draft on the reservoir, and was prepared from official records in the state engineer's office.

The table in the middle of the diagram shows water for various calendar years that entered the reservoir, and is the summation for entire year of what is shown below in the pink-tinted portion. The mean supply entering Lake Cheesman for the period is 118,400 acre-feet; this mean is not used in connection with this case. Witness then describes the next chart, which refers to ditches, in the order of location, from Platte Canon to Cache la Poudre, giving various data regarding priority of each ditch and prior appropriations

670 from which can be determined the location of ditch, the decade of its priority, approximately the volume, and how much is decreed ahead of it; the diagram was not prepared especially for this case.

The next diagram shows graphically how various floods along Platte river would be handled by various ditches covering flood water

months from 1905 to 1913; no month containing less than 700 second-feet flow shown.

By this diagram can be observed the lack of capacity or excessive capacity, and can determine readily whether there is water enough to fill certain ditches during certain floods.

(Exhibit 38 marked for identification.)

Shows water supplied the English High Line between 1901 and 1913, compared and checked with water commissioner's records. The year 1902 not platted because of lack of records; secured the records of the High Line from Mr. Wall.

Witness further describes Exhibit 38.

Exhibit 39 marked for identification. The first table shows witness' conclusions as to the amount of water available for storage in each year in each month of the year, from 1901 to 1913, inclusive. The red figures are a correction. Had no data on 1914.

Made an effort to show all character of operations of Cheesman lake as an irrigation supply, on 40,000, 50,000, 60,000 and 70,000 acre-foot bases; further describes Exhibit 39.

Describes Exhibit 39.

In his studies has treated the year as being a calendar year from January 1 to January 1; explains Exhibit 39.

Explains Exhibit 39.

Exhibit 39 does not graphically show the months when the water would go over the spillway, or the amount in the various months; that must be told from witness' notes; further describes Exhibit 39.

Describes Exhibit 39.

Exhibit 40 was prepared to show comparative relibility of Cheesman storage irrigation water right, and various other irrigation systems along the Platte. Describes Exhibit 40.

Figures on acreage, water supply and water duty taken from the Commissioners' reports in various years on file in the state engineer's office; has added the entire acreage in the various years, and divided by the number of years, and done the same thing with the water, thereby getting mean water supply and mean acreage and mean duty. No records for the years 1901 and 1902; with regard to "Water Supply in Lake Cheesman" and "Departure in Lake Cheesman," witness simply transferred the tables over from the computation.

Describes Exhibit 40.

671 Describes Exhibit 40. The duty charged to Lake Cheesman water in the Burlington table is the duty shown by actual application in the Burlington supply. Obtained the information as to crops raised under the Brantner ditch from the state engineer's office.

Determined that the Lake Cheesman supply, for a system operated like the Burlington ditch, would irrigate 25,300 acres, arrived at by taking the gross supply in Lake Cheesman, without any deduction for loss in transmission or evaporation, and dividing that gross supply by the duty of water; this amount would be reduced if proper deductions for transmission and evaporation were made. The elements of transmission and evaporation are not taken into consideration in the tables in Exhibit 40. Applying the Brantner duty to the Lake Cheesman supply, the acreage irrigable from the Chees-

man supply would be 15,300, and the same treatment is given the tables for the Fulton, Brighton, Farmers Independent, and Hewes & Cook ditches.

In the table referring to comparison of Lake Cheesman storage supply, with the maximum annual draft of 60,000 acre-feet, in the existing irrigation systems along South Platte river, during a period from 1901 to 1913, the ditches selected in preparing the diagram were the only ditches of any considerable acreage in district 2, and represent a range from the Burlington, with the poorest right, to the Brantner, with the oldest rights. Witness considers these ditches typical. Further describes Exhibit 40.

Describes Exhibit 40.

The Brantner ditch has the best record and the Burlington ditch the worst of those described. Cheesman supply departs next farthest from the normal, than the Burlington ditch; all the other ditches depart less from the normal, and are more uniform than the Cheesman supply. In these determinations witness used as a period eleven years, because have no records for the first two years; data secured from the records in the State Engineer's office.

Explains Exhibit 40.

In preparing the tables in Exhibit 40, witness aimed to determine the monthly and yearly supply available for storage at Lake Cheesman, and the relative reliability of the supply for irrigation purposes. Witness assumed that Lake Cheesman had a right to store 79,064 acre-feet any year when the supply was available to be stored in that lake, and that the reservoir had the right to carry over as much of that supply as was desirable and still store its maximum capacity, if available, for the next year; relied upon the com-
672 pany's record as to supply coming into the reservoir, and that the amount coming into the reservoir was the gross amount from which the storage could be obtained; and assumed that the records of the Antero reservoir, showing the storage there, were correct; and that the records of the English High Line were correct, and that the records of the water commissioners, showing the ditches that received water during each month of the irrigation season, and the last ditches that were receiving the water, was a correct statement as to the ditches shut down and the ditches that were receiving water, Placed all these records in the same category, and used them. Assumed that when any senior appropriated water in districts 8 or 2, was not available, that Cheesman had no right to store water.

Considered the English High Line, with a priority of 1879, at the head of district 8, as the limiting ditch; it irrigates approximately 22,000 acres of land. In district 2, considered the Burlington ditch as the limiting ditch, with a priority of 1885; irrigates 15,000 to 17,000 acres, and takes out of the river above all streams of perennial flow in the district. These ditches are at the head of irrigation in their respective districts. The High Line irrigates a total of 27,000 or 28,000 acres directly from the river, and the Burlington has under it about the same amount as the Brantner and Fulton; assumed that when these ditches, having a senior priority to Cheesman, were not receiving a water supply and needed it for irrigation, Cheesman had no right to store.

Exhibits 41 and 42 marked for identification. Exhibit 41 states witness' conclusions as to various months and years as to water supply for storage in Cheesman. Also conditions of irrigation along the river on various days and months. Exhibit 42 is a part of 41, which, for convenience, is put in a second volume.

First four pages of Exhibit 41 explain method used in obtaining the estimates that follow.

Goes back and explains Exhibit 40. Percentages of departure for duty of water in Brantner ditch is taken in terms of the duty of water. In Cheesman it is taken on the percentage of the water supply. Wishes to make a correction in Exhibit 40.

Witness then takes Exhibits 39, 41 and 42 and explains relations. At commencement of Exhibit 41 explains the use of exhibits.

Repeats testimony as to original data or records used in computation. In months where there has been water available during part of the time have taken records to determine what was available and equated it to the supply entering Cheesman. When all
673 ditches were receiving water supply and there was an excess of water entering district as shown by water commissioner's reports, have given Cheesman the entire supply entering the lake.

Have examined records of actual storage at Cheesman, and have often used the records of actual storage as limiting condition. Defines boundaries between districts 23, 8 and 2. High Line ditch is a limiting ditch in district 8, the Burlington canal the limiting ditch in 2; two canals have aggregate of 35,000 acres of land, and supply to these ditches shows clearly available storage in Cheesman. The extension of High Line canal for East Denver district, 60,000 acres, is shown. O'Brien canal is a joint canal with the Burlington for three miles. The original Burlington had capacity of 350 second-feet. The enlarged joint canal has capacity of 1250 second-feet. At bifurcation of two ditches three miles below intake, O'Brien canal has capacity of 900 second-feet, leaving to Barr lake for part of its capacity for Standley lake, and extends in a smaller canal to the Henrylyn district. O'Brien canal has not been adjudicated, probably 1904 or 1905, subsequent to Lake Cheesman. O'Brien canal runs on higher grade than the Burlington and permits enlargement of Barr lake, which has been enlarged to a capacity of 34,000 acre-feet. Its original capacity was 11,000 acre-feet. Division between upper and lower district 2 is where St. Vrain joins the Platte. It is the division used by the division engineer for convenience.

Graphical precipitation charts made from weather bureau reports for study in general way. Use of water often depends on rainfall. Further describes Exhibit 39.

Further describes Exhibit 39 as previously described.

No flood diagram for 1908, because there was no flood in that year. Used the flood diagrams in studying the question of storage. Takes June, 1907, as illustration, and knows that there was 1700 second-feet for one day.

English High Line and O'Brien canal could have taken the whole flood. The flood diagrams are not arranged in order of days, and

would not tell the days on which the floods took place, nor does the flood diagram, where it shows a certain flood for more than one day, mean that those days were successive.

Further explains diagram in Exhibit 39.

Further explanation of Exhibit 39. Used Exhibit 38 constantly to show condition of water supply in the High Line canal.

Further explains Exhibit 38. Further explains Exhibits 41 and 42.

674 The records in the office of the state engineer from 1905 to 1913 are full and explicit as to what happened in the way of ditches securing water from the Platte river. The records between 1901 and 1905 are very meagre. During latter period, must resort more to what was actually done in way of storage at Lake Cheesman and what was actually supplied to English High Line to form principal basis of estimate. Illustrates use of exhibit in the following way: "You will note in Exhibit 39, the first table, the table showing the estimate of volume of storage of water supply of the south fork, the estimate that has been allowed for 1901 for Lake Cheesman, the total volume being 63,220 acre-feet. On page 108 of Exhibit 42 you will notice in the first paragraph the general condition of run-off during that year, as shown by the records of Lake Cheesman. They were about 93 per cent of the normal run-off. The next paragraph is noted the precipitation for that year, and its departure from the normal, which is in tabular form for those quantities. During the months of January, February and March, the records for water supply entering Lake Cheesman show that the volume coming into the reservoir was 890 acre-feet, 840 acre-feet, and 4170 acre-feet, respectively. These are all estimated as being available for storage in Lake Cheesman. During the month of April there entered Lake Cheesman 11,900 acre-feet. The English High Line canal diverted 5000 acre-feet, and it is estimated that in this month the entire supply that entered Lake Cheesman was available for storage." Witness then explains the same thing by using the month of May.

Illustrates table by explaining application of month of June. Same illustration for June and July. Illustrates month of August, September and October. In October, High Line could not have used full supply if it could have gotten it, and so storage was allowed in Lake Cheesman.

Nothing in the diagram indicates that condition. It is merely a matter of opinion. Had no records of the Burlington ditch, and so allowed storage of 3600 acre-feet. All November and December storage allowed, making total of 63,220 acre-feet for the year 1901.

Records are more positive in 1902, but gives that year the same treatment as 1901. The year 1902 was a year of very low stream flow, and the High Line received only 5000 acre-feet, all, practically, in the month of April. Months of January, February and March are all estimated as available for storage, and all the water entering Lake Cheesman in those months was allowed. No stor-ge is estimated for April, because of the meagre supply that the High Line received; and there could have been no storage during April, May,

June, July, August, September, October and November.
675 Witness explains tables as to 1904 in Exhibit 42.

Corrects Exhibit 42, page 97; changes 3680 acre-feet to 2680. Continues explanation of treatment of year 1904.

Continues explanation of 1904.

Continues explanation as to 1904, and begins explanation of 1907.

Continues explanation of 1907.

Takes up September of 1907 and explains what his exhibits show with reference thereto. Where notes refer to a ditch as the last ditch receiving water, it means that it is the latest priority receiving water.

Wherever reference is made to a ditch receiving water, it is meant that it is the last ditch. Fulton ditch has four different appropriations. One is No. 21 in the '60s. Farmers Independent, one appropriation No. 23 is in the '60s. The exhibits do not give the date of priority of the different ditches. Witness takes that from his notes.

The earliest priority of the Fulton ditch, dated May 1, 1865, was receiving water September 21, 1907. Continues explanation of treatment of September, 1907.

Treatment of remaining months is exactly the same. Begins explanation of treatment of 1911.

Continues explanation of 1911.

April 15, 1911, the Last Chance ditch of April 3, 1865, was the last ditch receiving water. April 22, the Brown ditch of December, 1862, was the last ditch drawing water. April 29, the Brown ditch was the last ditch receiving water. During April, in district 2, on April 1, the last ditch receiving water was the Farmers Independent, of November 20, 1865. On April 8, the Meadow Island ditch, of May 3, 1866, was the last ditch drawing water. On April 15, the Farmers Independent ditch, of November 20, 1865, was the last ditch receiving water. April 22, the Farmers Independent, November 20, 1865, was the last ditch drawing water. On April 29, the Farmers Independent ditch, of November 20, 1865, was the last ditch drawing water. No water could have been stored in Lake Cheesman during April. Witness continues, giving in similar detail for the remaining months of 1911.

Only flood period in 1911 occurred in July, due to melting snows. About 3000 acre-feet were stored in Cheesman during this month, but this was immediately turned out, together with an additional 1000 acre-feet. Operations at Antero did not affect storage. During July High Line drew a full supply of water, but this included
50 second-feet of storage. On July 22nd there was 300
676 second-feet of storage water being sent down from district 23.

Witness then proceeds to describe the conditions in July, 1911.

Gives priority of Brantner, Burlington and Fulton ditches. Continues to describe conditions on the stream and the use of water in the month of July.

Continues explanation of treatment of the year 1911.

Continues explanation of conditions in 1911.

Turning to the year 1913, the precipitation for that year is referred to in the notes in Exhibit 41.

Diagrams of precipitation made two years ago. 1913 was 130 per cent of the normal precipitation. Month of December, that year, was 870 per cent of the normal, due to very heavy snow.

The year would have been below normal in precipitation except for the December snow. The year 1913 fairly normal for the entire period of time. That year it was 103 per cent normal at Lake Cheesman, and at South Platte, for both forks, about 112 per cent of the normal. This latter figure would be changed slightly, due to the storage at Lake Cheesman.

There were no large flood months in 1913. Largest flood passing Denver was in June, 1913; would have only amounted to 1650 second-feet, and the largest flood coming out of Platte Canon was a little less than 1500 second-feet. Peak floods in that year not as large as in a great many years. Have no record in 1913 for the High Line supply. There is nothing abnormal about the year.

Witness details treatment of the year 1913 from his exhibits 39, 40, 41 and 42. Gets figure for the High Line for that year from the figures of the water commissioner.

Exhibit 37 shows that water went over the Cheesman spillway from April until June of 1913. Witness continues to describe treatment of the year 1913 in detail.

Continues treatment of the year 1913.

Allows 3470 acre-feet available for storage in September, 1913, by taking the excess of water supply in district 8, according to the commissioner's reports, and allowed Lake Cheesman that amount as entering the reservoir, first reducing it to acre-feet, and that equalled 3470 acre-feet.

Witness is now describing the method used in determining the years 1901 and 1902 where the records were incomplete, 1902 being a year of short flow, and the year 1904 one of short supply, the year 1907 was a large year; 1911, a short year; 1913, a normal year. 1913 was normal so far as run-off was concerned, but below normal in actual storage supply. This shortage of storage supply
in 1913 due to condition of stream flow in the river during
677 various months. Nothing peculiar about the treatment of other years to which attention should be called.

Gave each year the character of treatment mentioned, and final conclusions appear on first blueprint sheet in Exhibit 39. Witness again describes Exhibit 39 and the second blueprint sheet showing his treatment of the different assumed drafts upon Cheesman reservoir.

Considered that assumed draft at 10,000 foot intervals covered all the practical limits necessary. Witness then proceeds further with his explanation of the assumed draft.

Water which goes over the spillway would be lost, but a record of it is a factor as an element showing the inefficiency of certain conditions of operation.

Continues explanation of operation of reservoir by his assumed draft of 40,000 acre-feet.

Continues explanation of 40,000 acre-foot draft.

Explains 50,000 acre-foot draft.

Continues explanation of 50,000 acre-foot draft.

Gives explanation of tables showing operation of 60,000 acre-foot draft.

Explanation of 70,000 acre-foot draft.

Maximum departure above the mean for the 60,000 acre-foot draft was 118 per cent; which is 138 per cent for the 70,000 acre-foot draft, but is as low as 23 per cent in the year 1903. There is more average water supply conserved for the 70,000 acre-foot than there is with the 60,000 acre-foot draft, but a much less efficient service, because there are many more years of deficiencies than occurred under the 60,000 acre-foot draft. In using 70,000 acre-foot draft, you are attempting to deliver more water in some years than is necessary to conserve the entire supply; consequently you are delivering too much water, and the 60,000 acre-foot draft will accomplish the same results with a more regular supply. Witness will make slips to be added to the exhibit showing percentages of the assumed draft that can be delivered each year, rather than the departure from the mean draft.

Witness explains 70,000 acre-foot draft based on Comstock's estimates of available storage. This draft might be possible on Comstock's estimate of available storage, but not on the witness' estimates.

Witness compares results of 60,000 acre-foot draft on his own and Anderson's estimates of available storage.

Witness thinks that for general irrigation use 60,000 acre-foot draft would give largest supply and reasonably good service. For the range of years from 1904 to 1914, assuming a loss in the average year for evaporation of 2000 acre-feet, the average draft
678 would be 48,440 acre-feet. Determined evaporation from various data; determined from the curve of the capacities on the diagram at what height in each month the water in the reservoir would stand. Took the acreage on the flow line of the reservoir corresponding to the various heights, and applied the evaporation coefficient and used for the month, thereby secured evaporation for each month and a total for the year; first deducted 18 inches rainfall from computed evaporation; deducted the average evaporation and arrived at an average yield of 48,440 acre-feet, starting with a full reservoir in 1901. On this draft there would be five years within the period when the reservoir would furnish less than 60,000 acre-feet. Made no evaporation estimates for the 50,000 acre-foot draft.

Between the year 1901 and 1914 the gross supply on 60,000 acre-foot draft would be 50,600 acre-feet average. The supply would vary from 23 to 138 per cent of the average quantity.

Further description of Exhibit 40, with reference to the comparison of the Cheesman storage supply on a 60,000 acre-foot draft with the various ditches shown on Exhibit 40.

Witness reaches percentage of departure used on last mentioned diagram in following manner: Took from records in state engi-

neer's office the acreage irrigated under the ditches used for comparison in the various years; then divided the volume of water annually diverted in acre-feet by the number of acres irrigated. This gave duty of water. The summation of all the annual duties divided by the number of years would give the average duty. By dividing the duty for a certain year by the mean duty for the period of years, gives a percentage which represents the period of departure of each annual duty from the mean.

In preparing the tables in question, evaporation was not included. If it were considered, it would reduce the 50,860 acre-feet to 48,680 acre-feet, 2000 acre-feet being deducted for evaporation, and corresponding changes would have to be made throughout the table.

In arriving at the acreage irrigable by the Cheesman water, witness divided the mean supply by the average duty of water. All the tables in Exhibit 40 are fully explained by the charts whereon the comparisons between Cheesman lake supply and the various ditch supplies are made.

Explains the charts.

Explains the charts of the Fulton, Brighton, Brantner and other ditches. The second set of charts makes the same comparison and illustration, using Mr. Anderson's estimates. The object of
679 making the comparative studies was to show in a practical way how the regularity of Lake Cheesman was supplied as estimated by witness Bull and Mr. Anderson, compared with existing ditches of size on the Platte river, and includes a consideration of how this sup-ly is distributed throughout the years.

The ditches selected represent the old water rights, with the exception of the Burlington. Witness recites priorities of the Brantner, Fulton, Brighton, Hewes & Cook, and Farmers Independent ditch, as shown on his exhibit.

These ditches represent the larger systems along the Platte river in district 2 and the best water rights on the stream in that district. The acreage under those ditches is not as large as that under the High Line. There are only 5000 acres, in addition to the lands under the High Line, which are irrigated in district 8.

Crops under the ditches selected for comparison are about the same as those under the High Line. They are on both sides of the river. On a 60,000 acre-foot draft Lake Cheesman will yield an average annual supply of 48,880 acre-feet, arrived at by deducting 2000 acre-feet from 50,860 acre-feet, as shown on Exhibit 39.

To determine proper draft on Lake Cheesman witness started with gross estimated supply, less evaporation of 50,860 acre-feet then made various studies of various drafts; in attempting to assume an operation on a 40,000 acre-foot draft it had a loss of 10,000 acre-feet over the spillway. On a 50,000 acre-foot draft there was a loss of 6000 acre-feet over the spillway, thus sacrificing average delivery to uniformity of delivery. On 60,000 acre-foot draft, it would reduce the loss over the the spillway to a minimum; and in taking 70,000 acre-foot draft no better results could be obtained; no greater saving of water, and a reduction in efficiency; so concluded that

greatest practical mean supply that can be delivered is 48,460 acre-feet on a 60,000 acre-foot draft.

If reservoir capacity was greater, could reach ideal condition of being able to deliver average supply every year. Explains column of percentage of maximum draft in Exhibit 39.

Tables show 85 per cent efficiency of delivery on the assumed operation of 60,000 acre-feet; no allowance for evaporation.

Averages evaporation at 2000 acre-feet per annum; it might be 1000 or it might be 3000 in different years.

The average supply from Lake Cheesman would be 48,860 acre-feet. In presenting water rights in Cheesman to a purchaser it would have to be stated that there was an average supply of 48,860 feet, and that some years it could deliver more and some
680 years less. That amount of water could not be delivered every year without enlarging the reservoir.

Witness does not enter into the question of the value of the water right. The maximum amount that could be delivered unfailingly each year from the reservoir would be 40,000 acre-feet. This would be at a loss of 10,000 acre-feet every year. The efficiency of reservoir water depends on its distance from the land where it has to be used for irrigation. As supply of reservoir water diminishes in regularity, water rights would decrease in value. Witness has given no consideration to the question of value. Studies have been confined to volume and efficiency.

Knows the character of the Platte river and the soil through which it flows. It follows a valley one to two miles wide, underlain by a bed of gravel; the same down into district 2. Has given consideration to the question of loss by seepage. On that question there is a variety of opinion.

Can only tell what the exact loss would be by actual experience. Describes causes of seepage.

Four to five per cent of the total volume of Lake Cheesman would be lost from Denver to Platte Canon. Thinks that in the operation of Lake Cheesman ten per cent would be lost from the lake to the place of application.

Made some studies concerning carriage of water through the High Line canal to the East Denver Municipal District; and determined the loss in transit in an enlarged High Line canal, would be forty per cent in the canal itself.

Making this determination, considered the size and kind of ditch, kind of structures; the fact that the old ditch had to be enlarged and the bottom cleaned and the present seal of the ditch broken, and the entire ditch would be like a new ditch, and the water would have to be carried clear to Denver before delivery on the land. The loss by seepage would be a diminishing quantity as the ditch becomes sealed. Is an engineer on a ditch in the San Luis valley, where it is estimated thirty per cent as final loss. Whether a reservoir supply is better than direct flow depends entirely on the reservoir and what is the direct water supply. The terms direct water supply and reservoir supply, themselves, do not mean anything. Two elements enter into the value of a reservoir water supply; Capacity of the

reservoir to control its supply and the supply to fill the reservoir. Knows of reservoirs that don't get any water at all, and other instances where the reservoirs are not big enough to control the water. Every reservoir has got to be considered by itself, both as to volume and regularity of supply, and in the same way the direct ditch you speak of has got to be studied, because it may
681 be a late priority and have no water, or an early priority and have water all the time.

The difference in value between a reservoir that has a water supply that constantly keeps it full, and one that has a supply that is only a percentage on the mean of the total capacity of the reservoir, is this: In one case you have got your average supply equal to the capacity of the reservoir, and the other you have an average supply that the capacity of the reservoir will control under conditions of each year's volume that is furnished. If the supply is bigger than the reservoir, the reservoir cannot control it. If the reservoir furnishes the capacity full every year, why, it is a constant supply. The only way to determine the value of the reservoir supply of Cheesman lake, in view of the fact that it has never been used for irrigation purposes, is to compare it with existing water rights of similar character and efficiency, and determine what will be the average water supply delivered from it.

How often are you going to get that supply? Will you get it every year or get a great deal more one year at the sacrifice of the next year? That is, what is its regularity of supply? The delivery on an average of 48,860 acre-feet in such a way that some years you will deliver 60,000 acre-feet and some years 48,860 acre-feet creates an element of weakness.

The lack of capacity to control the supply makes a sacrifice of efficiency to maintain average. Taking an old existing water right like the Brantner, which has the first right on the river, it has two elements of value, just as a reservoir has two elements of value. That is the amount that it can deliver under its priority and its amount of the regularity of the supply. It makes a difference whether the Brantner ditch furnishes a sufficient supply to the first of June, affording 3 acre-feet before the first of June, and thereafter is short of water. Reservoir water can be readily compared with the direct-flow right in regularity and volume of supply, and storage rights used for irrigation create the same kind of values that a direct-flow right does. The O'Brien canal could carry the annual Cheesman supply without enlarging. The only other ditch that could approximate it would be the English High Line, but it would need enlarging.

The O'Brien canal has filled on the flood waters of the Platte river for storage in the enlarged Barr lake and several reservoirs of the Henrylyn district, a distance of 25 or 30 miles.

Water carried from Cheesman lake to Barr lake and re-stored would lose from evaporation and seepage. In measuring duty of water witness has measured the duty at the headgate, and in-
682 cludes both the loss in the ditch and the water applied on the land. Witness in his tables has used the duty with reference

to the gross water supply the system consumes, measured at the headgate.

Witness' comparisons show comparative volume and comparative regularity of the flow as between Cheesman reservoir and certain ditches, and incidentally shows what similar volume and similar regularity of flow is required to create values in the locality. You have a comparison of volume and regularity and comparative data as to what volume and regularity have done in the way of creating values.

In other words, it is data that one having an expert knowledge of the value of water rights may use in reaching conclusions as to value.

(Thereupon an adjournment was taken.)

Witness has considered Standley lake, East Denver district and Henrylyn; all systems depending on combination of direct flow and storage.

In district 8, the East Denver Municipal district has a development of an extension from the English High Line canal for lands lying to the east and north of Denver, east of Barr lake, some 60,000 acres under the system. The English High Line has been enlarged and the extension to take in the 60,000 acres, north about as far as Barr lake. Several reservoirs contemplated in connection with it; district contemplated to secure storage from the Antero. Next system is Henrylyn district and Standley system, involving enlargement of Burlington ditch, construction of new ditch to Barr lake. Approximately 35,000 acres under the Standley-Barr lake system; 60,000 acres under the Henrylyn system. Barr lake has been increased from 11,000 to 34,000 acre-feet. Denver reservoir has constructed the Milton reservoir, filled from a canal from Platte river at Platteville; holds 40,000 acre-feet; 10,000 acres under the reservoir; filled through the Milton canal. Flood water control of Clear Creek through the Cook canal to Stanley lake has been an added development. Small reservoirs spoken of in east Denver district are distribution reservoirs.

Henrylyn, Barr Lake and Standley lake systems have been operated for some time. East Denver Municipal district has never completed construction of canal; no practical irrigation been under it. Milton lake system is active, and the Standley system is active from Standley lake; water from Clear creek; been more or less operation under the O'Brien canal since it was constructed. Some of these would use flood waters from the Platte river. Antero reservoir has been constructed in district 23, and will store 40,000 acre-feet, but the system has been constructed for much larger capacity. Lost Park reservoir has a claimed capacity of 17,000 acre-feet.

683 The approximate cost of the development mentioned is four or five million dollars in bonds. The last work was done on the East Denver Municipal district last year.

Witness has made a study of the Brighton, Fulton, Brantner, Farmers Independent and the Hewes & Cook ditches.

(And thereupon document Exhibit 43 was produced.)

Witness has examined water commissioner's weekly records from

1905 to 1913, inclusive (there being no records on file prior to 1905). Witness has compiled in Exhibit 43 the data from those water commissioners' reports showing when water would be cut off from the various ditches in question, assuming that when Lake Cheesman could be supplied these ditches could be supplied. This is done and set down in Exhibit 43, to show whether in connection with the old ditches in district 2 there are long periods of time when no water is available for them.

Continues explanation of Exhibit 43.

In considering available storage at Lake Cheesman, witness did not consider water company's claimed right to 66 second-feet continuous flow during the winter months for Platte Canon ditch, and assumed that during the winter months all water entering Lake Cheesman was available for storage there, and that none was necessary to supply the Platte Canon ditch.

If there was not 66 feet available above the Platte Canon ditch, water would have to be deducted from the storage at Lake Cheesman or from the 66 feet stored in some other place; it could not be stored in two places. Studies of the old ditches bring out the regularity of the water supply, the use and duty of water to secure the degree of cultivation that crop growths and conditions in these various districts require, and afford a comparison for new lands. For example, if 3.3 acre-feet per acre is necessary under the Brantner ditch, and we attempt to put this supply on similar lands, with an additional length of canal to serve the land, it is a fair indication of the water which must be supplied to get the same results. Cheesman lake water, if used for irrigation through an extension of old and existing systems, should not be counted on for higher duty than that shown by the old ditches, approximately 3.3 acre-feet to the acre.

In any canal system, if the canal required 3.3 acre-feet per acre and the Lake Cheesman supply was purchased to furnish 1 acre-foot of land, it would have to bear its similar proportion of loss in connection with the total supply required, as the rest of the ditches—it would lack just as much. There would be no higher duty for the Cheesman water unless canals were rebuilt so they could
684 handle water more efficiently. Exhibits 37 to 43 introduced in evidence, and Exhibits 41, 42 and 43 as being Mr. Bull's detailed testimony on the matters referred to.

Cross-examination.

By Mr. Dorsey:

Witness' testimony confined to study of the quantity and regularity of yield of Lake Cheesman. Witness determined this in the following manner: whenever witness determined that the High Line ditch, at the head of district 8, and the Burlington ditch, at the head of district 2, were not receiving an adequate supply of water, no storage was allowed to Cheesman; this method modified somewhat by consideration of other ditches, but witness' general assumption was that when direct rights in district 8 or 2 prior in time to Chees-

man could not receive water for direct irrigation, Cheesman would have no rights to store. The High Line ditch is the latest ditch in district 8 prior to Cheesman, and the Burlington ditch is the latest ditch in district 2 prior to Cheesman.

If the Burlington and High Line ditches were receiving an adequate supply, witness determined whether any of the South Platte water at Cheesman was necessary to furnish that adequate supply to the two ditches, and credited Cheesman storage with whatever South Platte flow at Cheesman was not necessary for such supply; for example, assuming that the commissioner's reports for a given period would show 500 feet in district 8, 300 feet in district 2, and that 200 feet would be excess over the direct flow demands of the ditches considered, and if an inspection of the record of the supply entering Lake Cheesman showed 200 feet at that point, the entire 200 feet excess would be credited to Cheesman.

Witness explains that in one month there was more water entering district 8 than was required therein, and there was no demand for the excess in district 2; therefore he took a period of two weeks and equated this with the amount that was flowing into Lake Cheesman, and took it for a number of days. If he had taken the minimum flow and equated it, it might have been in error.

On many occasions witness considered the actual storage at Lake Cheesman and allowed that storage in his estimates of assumed storage. Thinks this was done in one or two cases where there was just enough direct flow to supply the ditches prior to Cheesman in the two districts,—this on the theory that if the storage actually made in Cheesman were allowed to flow down, it would make an excess in the two districts. Witness did not assume any uniform proper demand in districts 8 and 2, but each week took the reports of the water commissioners as showing demand for that
685 period, and applied the water commissioners' reported demand rather than witness' estimated demand, taking water commissioners' statements at their face value and allowing Cheesman to store such part of the excessive flow over and above the water commissioners' demands as was found to be flowing in the South Platte at Lake Cheesman.

Water commissioners' reports not complete from 1901 to 1905; for those years witness relied upon storage records at Cheesman, High Line records and precipitation, and similar records; during that period allowed whatever was actually stored in Cheesman as proper storage; thinks that actual storage made by Cheesman in 1904 was the determining factor for that year. Knows of no case in years 1901 to 1905 where any possible storage was allowed in addition to what was actually stored in Cheesman, but determination for those years is not based entirely on actual storage at Cheesman; considered also the High Line records.

Cannot say whether in the years 1901 to 1905 Cheesman was allowed any possible storage in excess of actual storage; considered High Line records, and knows that from 1901 to 1905 Cheesman was in course of construction, and actual storage there could not have been an accurate guide.

Using year 1902 as a criterion for the period, witness illustrates that he considered record of precipitation and record of the High Line, showing that it received no supply, practically, except in April, and drew his conclusion as to possible storage from that data.

Began to use water commissioners' reports in 1905, the earliest year they were available. Years considered by witness can be divided into two groups: 1901 to 1904 without water commissioners' reports, 1905 to 1913 with water commissioners' reports. Detailed testimony confined to years from 1901 to 1913, but refers to 1914 as a complete year. In considering years 1901 to 1904, the practical method was to deny Cheesman storage whenever High Line canal was not drawing water.

Did not necessarily follow that Cheesman could store when High Line was drawing water; that question depended on the quantity the High Line was drawing. In the years 1905 to 1913 used the weekly reports of the water commissioners; used data of water company for inflow at Cheesman; commissioners' reports, which would show the quantity of water coming out of the canyon, and from Plum Creek and Bear Creek, and seepage; the demands of the district, and the statement of the last ditch receiving water, and notes in regard to general conditions of irrigation. Accepted these reports at face value; had no other data; accepted records on file in the state engineer's office in regard to Antero and Cheesman, and the commissioners' reports were the best data on the matters covered by them.

686. Did not investigate volume of stream flow further than the water commissioners' reports; assumed storage at Cheesman would be limited by amount flowing in south fork at that point. Emphasizes fact that nine times out of ten governing factor as to storage in Lake Cheesman is what ditches were and what were not receiving water supply. It is only occasionally that the flow cuts much material figure in what could be stored at Cheesman; as a rule, there is either feast or famine.

The commissioners' weekly reports show last ditch receiving water on date of report, and do not give the respective ditches of latest priority receiving water on intermediate days, but ditches are not opened up and shut down often enough to justify consideration of that variation. It takes time to change the gates of the various ditches to utilize variations in flow. Witness has not considered periods of half-day's storage, but takes a practical period, or considered any period of excess flow or short flow which was not long enough to permit regulation of ditches in accordance with the change of flow.

Witness gives example of reservoir in southern part of state, which is watched every day by deputy water commissioners, who regulates the use of the water in the reservoir and reads the gauge every day; when a peak flood of two or three hundred acre-feet comes into the reservoir, he orders it turned out to the ditches below which are not receiving water.

Ordinary floods that have occurred in the years from 1905 to

1913 would not be large enough to fill all the dry ditches receiving no water supply below Cheesman; this is shown by mass diagram relating to floods. It makes a difference whether, at the time a flood comes, there are a large number of ditches prior in point of time to Cheesman and entitled to take the flood, that have been dry for a long time, or whether such ditches have been reasonably well supplied with water prior to the flood, in considering the capacity of such ditches to take and use the whole flood.

It might occur that prior to a flood the ditches had been fairly supplied, and part of the flood would be available for storage in Lake Cheesman, and the water commissioner's report, made a few days subsequently, would not record the condition; and in this respect there is a considerable range of possibility; such occurrences would not be covered by witness' determinations; such floods might possibly have actually occurred.

Thinks water commissioner's reports are accurate and that the division engineers accept them.

Did not consult the division engineers' independent table of gaugings of the stream flow, or make a detailed comparison
687 of the water commissioner's statement of stream flow with the hydrographic data on file in the state engineer's office, or the reading of the gauges appearing on such data.

The first blueplint in Exhibit 39 shows available water in South Platte which could be stored by reservoir at Cheesman under Cheesman's priority, and in the tables which follow it the gross volume of Cheesman supply is shown, which is limited by the actual capacity of the reservoir; and column 7 in the tables of exhibit 39 is comparable with pla-ntiff's exhibit A-31, which is Mr. Anderson's estimate of storage in Lake Cheesman, limited by the storage capacity of the reservoir, but Anderson includes 1899, 1900 and 1914.

No material difference in respect to available storage for the comparable years between witness and Anderson, except for years 1911 and 1913. Witness compares in detail differences between storage allowed by Anderson and by himself during comparable years. Witness' average annual storage is 48,548 acre-feet; Anderson's storage for the same years is 53,729 acre-feet, or a difference of 9.6 per cent; the big difference appearing mainly in the years 1911 and 1913. The year 1914 is not included in the averages in the tables. The addition of the years 1900 and 1914 would increase witness' averages.

Witness' average, including 1900 and 1914, would be 52617 acre-feet, less 2000 acre-feet for evaporation. Mr. Anderson's averages for the same period would be 57,107 acre-feet, or a difference of 7.8 per cent.

In plate 4 of exhibit 37, diagram 2, the adjudications to the different ditches are arranged chronologically; in diagram 1 the ditches are arranged geographically, in order of place but not of distance. The English High Line appears as adjudicated priority No. 69, quantity 1184 second-feet, but by note it appears that capacity of ditch is 600 second-feet, or practically half of adjudicated priority.

The respective capacities of the Burlington and Evans No. 2 ditches are greater than their adjudicated priorities, but these ditches have been enlarged for the new systems served by them, and the additional capacities are now being adjudicated. All additional capacities are subsequent to Cheesman, and principally for storage.

In district 2, the total adjudicated priorities are 3800 second-feet, and the actual capacity of the ditches is 3400 second-feet. The original Burlington had an adjudication of 350 second-feet, and practically that capacity.

There are other ditches than the High Line which have decreed priorities in excess of capacity. That ditch has the largest adjudicated priority of any considered. Did not have in mind any
688 particular quantity of water that would be necessary to satisfy High Line or Burlington.

Witness would consider that if commissioners' statements showed 600 second-feet entering the district, and that 400 second-feet were required for district 2, and that the High Line was taking 200 second-feet, and the same sort of condition existed in district 2, he would assume that while the ditches were getting water they were getting all they needed, and that Cheesman might store all or a part of the south fork water. For further example, if 100 second-feet more were coming into the district than were needed, and there were 100 second-feet going into Cheesman, would allow Cheesman to store 100 second-feet, but if only 25 second-feet were coming into Cheesman, that would be the limit of its storage.

Requires the Burlington and High Line ditches to be supplied and an excess in districts 8 and 2 before allowing storage at Cheesman, except that by considering amount actually stored at Cheesman flow can be corrected as though Cheesman were not there. If Cheesman stores, and there was still an excess, that excess is added to actual storage to get possible storage. Storage at Cheesman is limited by the excess over and above the demands of these two ditches and by the actual flow in south fork at Cheesman.

The excess would be determined by the water commissioner's report as to the water flowing into his district over and above the amounts stated by him to be the needs of the canals; those reports taken at face value; unless such an excess existed, no storage permitted at Lake Cheesman; such an excess must exist over the demands of both districts 8 and 2. If the commissioner's reports show that the needs of the canals in district 2 were greater than the quantity of water entering the district from all sources, that would mean that Cheesman could not store. When in such reports it is stated that there is an excessive demand over supply, priorities of that district will be cut down, and the statement of excessive demands over supply is always borne out by the further statement that ditches of earlier priority are the last ones getting water: districts 3, 4, 5, 6, 7 and 9 are also tributary to district 2; they all lie west of the Platte and cover tributary streams. The superintendents of the ditches which are shut down make demands upon the commissioners, and this automatically corrects excessive demands in tributary

districts. These demands for water must be supplied as far as possible from tributary districts.

Witness assumes that when a ditch is not drawing water that it needs it and cannot get it. There may be times when a
689 ditch does not want water and would not take it, but when a ditch is dry for a long period of time and earlier ditches are not getting water, it indicates that that ditch does not get water because it cannot.

If a ditch is drawing less than its decreed priority, it ordinarily indicates shortage of water, but not necessarily; for example, if the English High Line is taking 100 second-feet and there is an excess of water in the district, and they could have taken 550 second-feet, it indicates that they took all they wanted and did not need a full supply. Has considered such conditions in estimating storage at Cheesman, but witness' notes as set forth in exhibits 41 and 42 would show what he has done in that respect.

Witness has not used a sweeping statement that a certain amount of water was necessary for the direct flow ditches, but has considered records of each month by itself; does not believe in such sweeping statements. If the High Line was taking 600 second-feet, witness would have no doubt that it was fully supplied; if it was taking less, witness would consider the particular conditions at that time. Ditches may have been taking less than their decreed priority, and yet be taking to their capacity, but that point does not enter, practically, into consideration of Cheesman storage. There might be 15 or 20 or 30 priorities shut off between the Burlington and the High Line, and that would show the water conditions in the district; the individual statement of one ditch would not cut much figure in the conclusion. Witness' notes show actual capacity of different ditches to divert.

If the difference between decreed priorities and capacities operated to great extremes, it would probably affect the situation. There are one or two priorities listed on the chart which have no existence. There is nothing particularly important omitted from chart No. 4, exhibit 37; there might be some small ones which are unimportant. Plate 5 of exhibit 37 shows the flood months; this plate gotten up to study general effect of flood in the river, and there was no use working out diagrams for months that had floods less than 700 second-feet, the point being whether or not certain floods would be so large that the ordinary ditch would not control. Thinks floods less than that could be taken care of by the ditches. Data for floods taken from geological surveys.

The records of the Geological Survey show gauges at Denver and gauges at South Platte taken daily. Gauging stations have been run differently at different times—some by Geological Survey of the United States, some by the state engineer, and some by corporations.

The flood diagram is made up from stream flows, day by day,
690 showing marked changes in stages of the river occurring in short spaces of time; some considerable changes within periods of 24 and 48 hours; these changes do not show chronologically on that chart.

Chart does not show at what time of month particular flood occurred or at what time it existed in respect to any other particular stage of the river. No floods in excess of 700 second-feet in 1908 or 1910, and only in the month of July 1911, and that month the raise was pretty uniform, from 400 second-feet up to 1200 second-feet. As compared with August, 1909, there were some extreme rises; in the latter month changes came in comparatively small intervals of time. The diagram shows whether variations are far apart, but does not show, day by day.

Flood diagrams show graphically what ditch capacity such a flood would have satisfied; that aids to determine whether the flood should be allowed to pass Cheesman.

Has not checked up the commissioners' semi-weekly reports. In the case of the reservoir in southern Colorado, referred to by witness, the deputy commissioner at the reservoir knows the needs of the ditches down-stream; when small floods come and are impounded, he is ordered to turn them out the next day, if needed; that is the Cucharas reservoir, of the Pueblo Rocky Ford irrigation system.

The deputy commissioner is constantly informed as to changes in the ditches below. Witness was, of course, not constantly informed as to changes that occurred during the periods between the commissioner's weekly reports, in considering the storage of floods. All witnesses are estimating on volume of water storable. If it were a matter of absolute figures, would all reach the same conclusion, and witness had no information except the water commissioners' report. The Cucharas reservoir is on a flood-water stream or creek. From the weekly reports of the Commissioners, there might have been a famine at the end of the week and a feast in the middle of the week, but witness has found no place where it was a feast. The last diagram of exhibit 37 shows some considerable floods, but they occur in months when the water supply is all available for storage.

Exhibit 38 was based on records obtained about two years ago from Mr. Wall, showing the High Line operation; should have stated in direct testimony that he had no records of river flow for 1901, but has such records for 1902; did not see the record of river flow for 1901, but there is such a record, and also one for 1902;
don't know whether they are in the state engineer's office,
691 but they are in the Geological Survey. Referring to exhibit 39, showing total available storage in the south fork of the South Platte river for various years and months, as stated, the years 1901 to 1904 were based upon High Line diversion, precipitation records and storage at Lake Cheesman. If witness stated that years 1905 to 1913 were based entirely upon reports of water commissioners of districts 8 and 2, it was incorrect. In the period from 1905 to 1913 did not allow actual storage at Cheesman as available storage, unless the water commissioner's reports showed it was properly made.

In one month there was some question as to whether actual storage should be allowed, and witness allowed it; took actual storage into account, but it did not influence judgment.

So far as demands and requirements of ditches below Cheesman

were concerned in 1905 and thereafter, based conclusions entirely on the water commissioners' reports; that was the controlling consideration in making up mind whether storage at Cheesman should be allowed. Is satisfied that water commissioners' reports should be credited at face value. Commissioners are local men, appointed by local influence, but that is true of all the records used by the witness; did not use the United States Geological Survey records; thinks data as a whole is very good; would be true that water commissioner does not minimize the needs of his district in his reports.

The superintendents of the different ditches in a district do not let their water commissioner get far off from being fair; naturally a commissioner will do his best to get water to the people in his own district, and the superintendents in his district are urging him to get water, and he would be influenced by them rather than by the superintendents of ditches in districts that are trying to keep the water. Cheesman water would have to be transferred for use for irrigation.

It is more reliable to go back and say the Fulton ditch has got water than to go back to some abstruse proposition. The important factor in the commissioners' reports is the report of what ditches are taking water, and nine years out of ten the conditions in this respect are so clear that you can say that the real measurements are secondary to the working out of the system of whether the water was available or whether the ditches were going through.

Both districts must be considered before conclusion as to storable water can be reached. If High Line was getting 100 second-feet at a certain time and the Burlington was getting 200 second-feet, that would be one of the instances where it would be necessary to consider seriously what the commissioner says was the kind of water going into the district and the amount required, and his statement would be taken at face value, and that witness has done
692 wherever a similar condition arose, taking into consideration also precipitation and storage.

Referring to exhibit 39, blueprint for 1902 shows available storage to be 8340 acre-feet, and Mr. Anderson, by exhibits A-31 and A-32, shows available storage of 10,962 acre-feet. This was the lowest year under estimate. Only 18 to 20 per cent of the normal flow entered Cheesman; the total stream flow was about 28 per cent of normal.

Estimates storage in January, February and March of all the flow of the south fork, but in exhibit 37 allows no storage in April, 1902. The chart of actual storages appearing in exhibit 37 shows actual storage at Cheesman in April.

The 780 acre-feet of actual storage in that year was disallowed by witness. Page 106 of exhibit 42 shows the precipitation in April was only 29 per cent normal. On the High Line canal diagrams, it is shown that that ditch got 100 second-feet most of the time and 40 second-feet for the month. It would not take long to store 780 acre-feet in Cheesman, but some ditches must have been shy. In 1902 ditches took water in April; water commissioners' reports show that all the ditches through both districts start taking water about

April 1st, and in dry years some of them start in March. Has not looked up division engineer's reports to find when and in what relative quantities water is diverted by direct irrigators in the month of April; imagines it would be about 5 or 7 per cent for the month of April.

There is not so much demand for irrigation in April. Does not think that the fact that the High Line was drawing 100 second-feet in April indicates that it had all it needed. Thinks ditches are likely to demand all they need.

Sometimes a demand upon Lake Cheesman to turn out stored water would not be promptly complied with, but cannot say that that was in April, 1902. It would have taken about three days to store 780 acre-feet. Has not the records to show varation in flow of the South Platte at the intake of the High Line during the early days of April, 1902. The supply at the headgate of the High Line at the beginning of April was 125 second-feet; there were three or four days at the beginning of April, 1902, when the High Line did not divert any water, although it had diverted a little in March and began to divert again about the 3rd of April, during which time the water in the river rose 25 second-feet. This would indicate to witness that someone else wanted the water. About the 4th of the month there were 30 second-feet taken by the High Line; this continued until there was a 600 second-foot flood in the stream;
693 the canal then took 100 second-feet, and after the peak flood went by, it took 40 second-feet; and then there was another peak flood of 550 second-feet, and the canal diversion rose to 100 second-feet, and the flood went down, and the canal was cut down to 40 second-feet; another peak flood followed, and the canal diversion went up to 75 second-feet, and then down again, and then was cut off. This is conclusive evidence to witness that canal was being regulated on the flood. The fact that 100 second feet was all the High Line needed during peak floods does not indicate there might have been storage in Cheesman. Although the supply in the stream was rising during the first three or four days of April, the High Line took nothing, but it must be considered that there are nearly 250 second-feet of ditches in district 2 of earlier priorities than the High Line; is inclined to think that the demands of these ditches cut off the High Line. Demands of the earlier ditches may have ceased when the High Line began again, and diverted 40 second-feet.

The hydrograph for year 1902, in exhibit 38, shows that the flood in the river at the High Line intake rose to a rate of 600 second-feet. The demands upon that 600 second-feet for direct flow rights might vary in different years; that was one of the principal reasons for using monthly method instead of considering some arbitrary rule.

Exhibit 38, hydrograph relative to year 1902, shows that later in the month of April the stream rose to a rate of 575 second-feet, and between the two high flows mentioned it rose to 450 second-feet, but witness thinks that during those periods ditches were limited

to the amount taken by them. About 1500 acre-feet was sored in Lake Cheesman in October and November (exhibit 37).

Witness has not allowed it. As a mathematical statement, the addition of the storage actually stored in Cheesman at times when no storage was allowed by witness, to the storage allowed by witness at other times—the difference between witness' estimate and Anderson's estimate for the year would be practically wiped out. Witness did not allow November and December storage, because the High Line, with 20,000 acres under irrigation, had no water in May, June, July, August or September; in October it had about 200 acre-feet, and in November 500 acre-feet. There were some heavy rains, as shown by exhibit 42, page 105; that rainfall was 370 per cent of normal, but that rainfall would not take care of the fact that the district was burned out for five or six months, and irrigation water would have been needed in October and November. In the year 1911 witness allows 9690 acre-feet storage, as shown by exhibit 39, and Anderson allows 29,544, as shown by exhibits A-31 and A-32, or a difference of 19,854 acre-feet in that year.

694 In 1911 witness allows entire flow of South Fork to be stored in January, February and March. After the month of April, there is no storage until November. Witness referred to page 1959 of the transcript of his testimony, and to page 27 of exhibit 41, and corrects testimony to read that 4,000 acre-feet was stored in the Antero up to May 1st.

The 4,000 acre-feet so stored in Antero should be added to the storage in Lake Cheesman during the winter months. On page 25 of exhibit 41, the September 1912 storage was overestimated 6,000 acre-feet, so witness did not make correction for the additional 4,000 acre-feet in 1911.

It would not be fair to compensate a mistake in a short year like 1911 by setting off against it a mistake in a plenteous year like 1912.

The fact, shown in exhibit 41, page 27, that there was a withdrawal from Cheesman during the months of January, February and March, 1911, of approximately 4,000 acre-feet, leaving 1,000 acre-feet at the beginning of the year, is not significant, and is merely relative information.

The withdrawal of 4,000 acre-feet from Lake Cheesman during the period mentioned might account for storage of 4,000 acre-feet at Antero.

Witness' statement on his exhibit "Thus accounting for the storage of supply in Antero" not necessarily correct. At any rate, does not affect the storage available for Cheesman. The withdrawal from the Antero and the storage in Cheesman at the time in question have no relation one to the other, so far as witness knows.

Witness will have to correct exhibit 39 for storage in those months in 1911 when there was actual storage in Antero. Exhibit 41, page 28, shows there could have been no storage in Cheesman during April, 1911, and exhibit 39 allows no storage for that month.

There was some storage in Lake Cheesman; did not investigate whether there was storage in Antero; Antero storage would not appear in the stream flow. Notwithstanding actual storage at Chees-

man and Antero, witness did not allow it because of the water commissioners' reports.

Highest flood in April, 1911, was 150 second-feet, or 300 acre-feet each 24 hours. It would take 3 days to produce 858 acre-feet. Water commissioners' records show a drought through the entire period. In June, July, August, September and October, 1911, no storage allowed on exhibit 39; that is based on the water commissioners' reports.

During that period storage actually occurred at Lake Cheesman in considerable quantities. Witness did not estimate it as avail-
695 able storage. There was also storage in October, which was not allowed; based estimate upon water commissioner's report and correspondence in the state engineer's office with regard to the storage in Lake Cheesman; correspondence referred to is exhibit No. 36.

From a consideration of the water commissioner's report, which the witness gives in detail, witness justifies that conclusion.

According to witness' statement, water commissioner's reports show that the Burlington ditch received no water during the month of July. Page 32 of exhibit 41 shows that in the month of July, 1911, the only flood period of that year occurred, and that is shown upon the diagram, exhibit 37. Copy of water commissioner's report for July 1st, was read to witness, showing that the Burlington ditch ran water July 4, 7 and 8.

Witness explains matter of 4,000 acre-feet storage in Antero.

The supply in May, 1911, should have been 3,400 acre-feet; the supply for May, 1910 should be reduced 6,610 acre-feet, and on an assumed draft of 60,000 acre-feet, this would necessitate the correction of the amount carried over at the end of the year 1910 from 19,420 acre-feet, as given, to 12,802 acre-feet. The storage of 4,000 acre-feet at Antero includes 500 acre-feet stored in April, but there was no storage water available in April, it was not legitimate storage; does not consider the change sufficiently material to carry it through the tables. Originally estimated 6,610 acre-feet as possible storage in May, 1910, but now finds it should not have been so estimated. Cannot tell what the error was; thinks it was in reading commissioner's records.

The first table in exhibit 39 is inaccurate as to the possible storage in May, 1910, of 6,610 acre-feet, and lacks 3,400 acre-feet in May, 1911. Commissioner's report for July 1, 1911, as read to witness on page 2138 of his testimony, was correct, and the Burlington ditch did have water on those dates.

Witness thinks that report indicates that the Burlington ditch wanted water at that time and was not allowed it. Report contains no statement of the amount actually diverted by the Burlington on the days mentioned.

The hydrograph of Lake Cheesman contained in exhibit 37 shows that storage actually occurred in the month of June and July, 1911. Exhibit 41, page 32, shows that in June and July, 1911, about 6,000 acre-feet was stored in Cheesman, and turned out beginning about the 15th of June.

According to the records of the company, 4,912 acre-feet were stored from the 15th to the 20th of June, 1911, and 6,430
696 acre-feet from the 3rd to the 8th of July, and the 22nd and 23rd of July, making a total of 11,342 acre-feet. The hydrograph in exhibit 37 shows the total storage of something like 7,000 acre-feet. The withdrawals occurred between July 8th and 22nd, at the rate of 635 acre-feet per day, or a total of 9,363 acre-feet.

The water commissioner's reports show that from 100 to 120 acre-feet per day were withdrawn for the company's uses. Witness' assumption that Cheesman had no right to store this amount based upon general conditions along the river and correspondence in the state engineer's office. Did not consider one more important than the other. Made no examination of flows of the stream at Platte Canon, day by day, early in July, and on the 22nd and 23rd of July, when the storage occurred.

Witness examines Mr. Comstock's exhibit A-53, and knows what is meant by, "Stream flow corrected for Lake Cheesman." From that exhibit it appears that the stream flow at Platte Canyon was 1,612 second-feet; that on July 5th it was 1,607 second feet; July 6th, 1,556 second-feet; July 7th, 1,373 second-feet; July 8th, 1,327 second-feet; July 9th, 1,091 second-feet; July 22nd, 1,007 second-feet; July 23rd, 1,032 second-feet; assumes those figures to be correct. Referring to the last diagram in exhibit 37, it appears that after correcting flow at Denver for needs of district 8, the gross flow was 900 second-feet for one day, and for a number of days it was something like 800 second-feet, and then continually diminished until for the entire month there was 350 second-feet flowing in the stream. The total water supply passing Denver and entering district No. 2 was possibly 35,000 acre-feet, and there was in district 2 nearly 3,400 second-feet actual ditch capacity to use this water. This has a bearing on the question. In the diagram in exhibit 37, the flows in 1911 should be corrected by adding the actual Cheesman storage.

Whether these floods were needed for beneficial purposes in district 2 depends upon the report of the water commissioners. Referring to the water commissioner's report of July 8th, 1911, it appears that on that date there were 1,530 second-feet entering the district and 650 second-feet required. There was no unsupplied need in district 8, and storage was going on in Lake Cheesman.

In district 2, on July 1st, 1911, there were 680 second-feet entering the district, 1,200 second-feet required; water commissioner's report on that date was, "This is Monday morning. A good general rain in this district July 2nd, conditions relieved."

697 It appears further on exhibit 41, page 33, that in district 2, on July 8th, 1911, there were 1,290 second-feet entering the district, 1,200 second-feet required, Brantner Third Enlargement was taking water. From this it appears that notwithstanding Cheesman was actually storing at the time of these reports, district 2 was also fully supplied.

It appears that for the week ending July 8th, 1911, the Burlington was drawing water part of the time, and there was more water in the district than was needed. There are periods of perhaps a day or

two where, under strict enforcements, a ditch might have been shut down or opened up, but that period is too short for practical administration of the water. Places will be found where, according to the records, districts 8 and 2 were so short that Cheesman should not have stored, but witness assumed these conditions relieved before it was necessary to cut Cheesman off, and has assumed that in flood conditions, for a period of a day or two, all the water would be required in certain districts.

For a certain day there might be an apparent additional supply, but the next day would show a striking shortage. Does not think Cheesman had a right to store in July, 1911; the flood would spread out and Cheesman would not have a right to store, if the flood could be used by prior ditches down the river.

Witness estimates some storage at Cheesman at times when it would not technically be proper, and this balanced the disallowance at other times when storage would be technically proper.

Witness thinks that in certain periods where storage automatically occurred, there would be reason for regulating it and turning it out the next day if the district had needed the water; for the question arises whether water can be stored which, if allowed to flow down the stream, would on the next or succeeding days reach ditches which would have need for it; this is not equivalent to saying that you cannot store on peak flood, for the peak flood may be so great that the ditches cannot use it. The propriety of storage is not to be determined as of the day when the storage is made, but the general effect of the flood stored on other water rights that might want to use it should be considered. A reservoir might be permitted to temporarily hold peak floods until conditions below were known. Thinks water would go from Lake Cheesman to district 2 in 36 hours, or two days.

There was no shortage on July 8th in district 2. There was a shortage on July 15th. Does not know exact day when the shortage began.

If the water stored in Cheesman on July 8th had been al-
698 lowed to flow down, it might have done good to some district below district 2.

Does not think storage should have taken place in Cheesman July, 1911.

Cannot say how long flood must continue or how large it must be in order to permit storage. Conceding that in July, 1911, the stream flow at South Platte ran constantly at the rate of over 1,000 second-feet for a period of ten days, and Cheesman was storing, witness does not think the storage was proper, for the Burlington got water for three days and had had no water since March.

Witness cannot say offhand how long the peak flood would have to run. Witness was referred to exhibit 41, page 59; based the conclusion that there could be no storage in October, 1911, on the fact that Burlington and the High Line were without water, as were other ditches in districts 8 and 2.

In that month 2,000 acre-feet were stored in Cheesman and 4,500 acre-feet in Anero.

Witness was asked whether, if High Line with its direct appropriation, owned the Antero, which had storage water, with priority sub-

sequent to the direct appropriation, it was probable that the High Line would permit the Antero to store water that was needed for direct irrigation; witness says that should not have been allowed, but officers of High Line may not have desired to deplete their storage for the benefit of their direct right users; the High Line management might not have advised their users; had they done so, the users would probably have made objection.

Cannot assume that anybody was trying to be dishonest; does not know why the water was stored in Antero, if there was a direct flow demand for it in the High Line. Witness had assumed that in October, 1911, there was an unsupplied need in the High Line.

The facts indicate that the High Line stored some of its direct flow in Antero.

Thinks the facts show that the High Line people preferred to store their water for use next season than to use it in October, 1911.

The fact that Lake Cheesman was storing at the same time might indicate that the High Line was ignorant of the conditions, or Lake Cheesman refused to let water out, or that the High Line had no use for the water.

The fact that Cheesman and Antero were both storing, does not show that High Line did not need water. The conditions in district 2 have something to do with it.

699 Insists that the English High Line, with 20,000 acres to irrigate, would need a water supply the last three weeks of August and in September.

Water commissioners' reports for September 30 and October 20 show that on latter date the district was supplied with water and the High Line was not drawing water.

The attention of witness was called to the fact that for nearly three weeks in the month of October commissioners' reports conveyed no information; the report for October 20th shows snow; the report for October 14th shows greater portion of water used for domestic purposes; report on October 28th in district 8 showed water used for domestic purposes; this indicates no special irrigation need; is not certain that there was any demand from district 2 to have water turned out of Antero or Cheesman. Weather conditions ought to be somewhere near the same in district 2 as in 8; the report of September 30, 1911, for district 2, shows heavy rains. The report of October 14th shows "ditches all closed between Monday noon and Tuesday night." No demand for water made in report of October 14th. Report of October 28th states "Weather has been cool and dry, with slight snow, and Burlington diverting 100 cubic feet per second for storage."

Other records not quoted show decided demands for water. For example, report of September 30, shows 430 second-feet entering the district; 1,000 second-feet required. The Fulton ditch, priority of 1865, the last ditch receiving water. The foot-note of the report says, "Heavy rains, Saturday night, September 30th, at Brighton and Platteville." On October 7th, the supply was 490 second-feet, and the demand was 800 second-feet, the Fulton ditch receiving water.

On the 14th the record is incomplete; has no information as to the 14th.

The report of October 14th, does show that 385 second-feet was coming into the district and 385 going out; this i-dicates no diversion. Ditches all closed between Monday noon and Tuesday night, October 9, 1910; indicates absolutely no demand for irrigation for three days. This is weekly report, and does not indicate demand for any time during the week; there might have been possibility of storage in Lake Cheesman during that period for a few days. On October 21, 395 second-feet were entering the district, 800 second-feet required, and the Fulton ditch was the last ditch receiving water; at the end of the month it was about a balance as between supply and demand.

Report of October 28th, shows that 100 cubic feet per second was being diverted for storage; did not note that on examining the report; the demands therefore relate in part at least to storage; the Burlington ditch has 350 second-feet capacity, and its storage right is
700 prior to Cheesman. If it could have secured the water, would have taken more than 100 second-feet. Barr Lake has storage right of 11,000 acre-feet, prior to Cheesman.

Did not know that Burlington storage was all completed before April of each year. Does not necessarily justify a conclusion that Lake Cheesman could not store.

The rate of flow into Cheesman during the month of October from the 4th to 10th was an average of 135 second-feet or 270 acre-feet a day, or practically 2000 acre-feet in the time.

The stream flow at Cheesman would have supplied 2000 acre-feet during the time when the water commissioners' records are incomplete.

Witness again admits correction of his possible storage for year 1911 as shown on exhibit 39, by adding 3400 acre-feet for Antero storage in January, February and March, which could have been stored in Cheesman.

There was storage in April of about 600 acre-feet, which should not be added; does not add the 2000 acre-feet stored in Cheesman and the 4500 acre-feet stored in Antero in the month of October, 1911, because the question whether Barr Lake was filled or not enters into it, and on November 1st, 1911, Barr Lake was empty, and they would store if they could.

Barr Lake has a right to fill the reservoir and make up whatever is lost by evaporation and seepage which is a very material amount in that reservoir; that reservoir leaks; adjudication gives them right to make up for loss by leakage. Thinks that Barr Lake decree would permit to store its original 11000 acre-feet, and if it all leaked out, fill again to capacity.

Barr Lake was filled at the beginning of the season and empty at the end of the season, and there was only 5000 feet of direct flow in the canal. It would not matter whether Barr Lake actually wanted the storage in October, for witness is estimating what under normal conditions Barr Lake could store.

Distinguishes between exceptional and normal conditions, and thinks that if Barr Lake was filled in the spring and empty in the

fall, and the owners were filling it again, that would be a normal condition; so, if Barr Lake was actually being refilled in October, or was being repaired and no water was wanted, witness would reject those conditions and substitute some condition appearing to the witness to be normal.

Understands that Barr Lake may make up any leakage from the stream. There is a loss in Barr Lake normally of 2160 acre-feet between January and April, and of 3000 acre-feet during the irrigation season, and from October to January 720 acre-feet, or in all 6800 acre-feet. The evaporation would be 2000 acre-feet per annum.

701 As witness interprets Barr Lake decree, it has the right to take from the river and store twice 11,000 acre-feet. In June and July 11,342 acre-feet was stored, and if that amount, added to the October storage, of 6500 acre-feet, and the correction of 3400 acre-feet for the winter months, were added to witness' estimates, it would make up the difference between witness and Anderson for the year. The year 1913 was normal as to runoff, and below normal as to storage supply; this is true as to main stream and tributary streams; as to the tributary streams below the mouth of the canon, witness was informed by the commissioners' reports; did not consider them for the purpose of determining whether normal or not, and did not investigate tributary streams for that purpose; has some notes on the effect on the stream flow of storages made and transfers of water from Antero and Cheesman.

20,500 acre-feet passed from Antero into Cheesman; 11,000 acre-feet was stored in Cheesman in July, August and September, 1913. Witness' attention called to this fact, and to page 11, 12 and 9 of his exhibit 41 for correction; there seems to be some confusion in exhibit 41 from using the Antero portion and the chart; there may be some mistakes in copying; has never had a chance to correct it. Got figures on quantity flowing into Lake Cheesman from the records in the state engineer's office taken by The Denver Union Water Company.

Does not know the details of how these records are taken, but understands there are gauging stations at each of the tributaries. Lake Cheesman is fed by the south fork of the Platte and by Goose creek coming from Lost Park, and by a creek called Turkey creek, of intermittent flow, and floods from dry water courses, and springs in the bed of the lake. Understands that the inflow is determined by readings on a gauge board, which shows changes in the level of the lake. Understands there are gauges around the lake, but thinks measurements at Goose creek and south fork should be controlled by the gauge of the lake heights, so that that is equivalent to a scale measurement.

It is impossible to measure separately all the various inflows into Lake Cheesman as a practical matter; the evaporation would not show on the gauge.

Counsel illustrates use of the gauge board, and witness says that by taking the different levels on the gauge board, the accretions to

the reservoir make up the evaporation before any increase is registered.

Evaporation should be added to the records of the total flow of the stream at Cheesman; makes no difference whether the water is running over the spillway. Hydrograph of Lake Cheesman in exhibit 37 shows that the level of the lake rose with com-
702 parative regularity until May, 1905, and it has been partically full all of the time since. This condition would give a maximum of evaporation, which would average something like 3,000 acre-feet per annum; to this should be added seepage from the lake. The question of seepage and evaporation is a new one to witness, and he is reluctant to answer without further examination.

In exhibit 39, table 3, showing method of handling Lake Cheesman on a 60,000 acre-foot annual draft, started January, 1901, with a full reservoir, and added month by month the volumes of storage available, wasting over the spillway whenever there was more than a full reservoir, and available storage which could not be made because of the full reservoir would be wasted.

The first large blueprint in exhibit 39 shows the 60,000 acre-foot annual draft; in the upper diagram that part is applied to witness' estimates of storage, and shows draft upon reservoir beginning late in May and continuing in June, July, August and September. This was done because other engineers estimated on the same basis.

Assumed the following rates of draft: 12,000 acre-feet in June, 24,000 acre-feet in July, 18,000 acre-feet in August, and 16,000 acre-feet in September; that method of draft assumes the use of the reservoir as a supplemental water supply; Changed the draft in the first year, thus making a saving of twelve or fifteen thousand acre-feet of water, which would mean a thousand acre-feet of the total supply for the mean time; the only place this makes a difference is at the beginning of the diagram. Explains further his table showing drafts. If the year 1914 is added to tables, the average draft would be increased to 51,546 acre-feet.

Witness does not include the year 1900, and has no records on it. He is prepared to assume that 1900 is a year of large flow. By including the year 1900 witness would have 19,064 acre-feet at the beginning of 1901, instead of full storage, but would have supplied full 60,000 acre-foot draft in the year 1900, and could have stored 32,600 acre-feet in the early months of 1901, which had to be wasted, according to witness' tables; and could have supplied the 60,000 acre-foot draft in 1901.

If the year 1900 was added, the average from 1900 to 1914 would be increased 2,110 acre-feet. Witness corrects his testimony given on page 2007, and states that he should have said that the average supply delivery of 50,860 acre-feet, with a maximum draft of 60,000 acre-feet, would be the most satisfactory supply. Does not wish to confound "draft" with the term "mean supply."

703 Intends to state that with 60,000 acre-foot maximum draft he would be able to deliver the largest average annual supply with the least fluctuations from the mean supply delivered, which is

shown clearly from the fact that with 70,000 acre-foot draft you are get-ing no more water supply but a more regular supply year by year. 60,000 acre-foot draft would give good service. Witness corrects previous testimony on page 2007 in which he refers to a range of years between 1900 and 1914, and says those years should include 1901 to 1914.

Column 8, 60,000 acre-foot draft table, exhibit 39, shows what is furnished out of the reservoir, and includes every year from 1901 to 1913, and those are the years averaged, and that average will be raised if the year 1914 is added.

The average on the draft of 60,000 acre-feet, if 1914 is included, would be 51,500 acre-feet, on the same basis as the tables, and if the year 1900 was added it would raise the average still more; and on direct testimony, when witness spoke of a period between 1900 and 1914 of an average of 48,440 acre-feet, after deducting 2,000 acre-feet for evaporation, he was referring to the years 1901 to 1913 only. Witness' evaporation estimate on direct examination was 2,000 acre-feet per annum; this evaporation estimate was based on fifteen hundredths of a foot in January, February and March, sixty-three hundredths of a foot in April; forty-eight hundredths of a foot in May; eighty-seven hundredths of a foot in June; sixty-nine hundredths of a foot in July; seventy-one hundredths of a foot in August; fifty-one hundredths of a foot in September; forty-one hundredths of a foot in October; thirty-five hundredths of a foot in November, two tenths of a foot in December. These figures refer to fraction of a foot, and are applied to whatever area the surface of the water had in any month or year. These are Signal Service Tables of evaporation; they are taken from various engineering reference books, and are standard tables. Thinks they were taken from Turneaure & Russell on Water Supply. The rainfall is deducted from the evaporation; taken out of the total for the year over the average surface. As to rainfall, took the average area of the year that the reservoir covered, taking 18 inches as an annual rainfall, and subtracted that from the total results of evaporation, and vertical loss would be 3.8 feet. Illustrating for the year 1908, the diagram shows in the various months the volume of storag.e From these volumes of storage can be ascertained the height of the water and the area of the surface; then, having the factor of area and factor of monthly evaporation,
reached the result. The unit of evaporation used was the
704 average for the month and the unit of surface was the average surface for the month; went through each year month by month. The average acreage for the year 1908 was 670 acres, the gross evaporation was 4,191 acre-feet, and the net evaporation 3,186 acre-feet. This was arrived at by deducting the rainfall from the gross evaporation.

Witness corrects his testimony; he is talking of 1907 instead of 1908, and all previous figures apply to 1907. The average acreage for each month in 1907 was as follows: 616 acres in January, 650 acres in February, 710 acres in March, 748 acres in April, 874 acres in May, 874 acres in June, 874 acres in July, 788 acres in August, 730 acres in September, 740 acres in October, 740 acres in November; 740 acres in December; took the end of each month;

instead of taking the average for the month, took the exposed surface on the last day of each month; this would not introduce any practical error. The average acreage for the year 1907 was 755 acres. Calculated an average acreage for each year in order to apply rainfall; has not all the tables.

Does not care to answer whether in the year 1901 part of the 32,600 acre-feet estimated as wastage could be used to take the place of evaporation loss.

In the year 1901 witness deducted evaporation, notwithstanding all the decreed appropriation had not been utilized and 32,600 acre-feet were wasted over the spillway, and still thinks that is proper.

Referring to exhibit 39, to the table based on the 60,000 acre-foot draft, and to column 8 thereof, and the percentages put in in red ink, for the period from 1901 to 1913, inclusive, there would be eight years of 100 per cent efficiency, one year of 95 per cent efficiency, one year of 87 per cent efficiency, one year of 59 per cent efficiency, one year of 43 per cent efficiency, and one year of nineteen and one-half per cent efficiency; 1903 was the low year caused by the low supply in 1902 and 1903. By including 1900 and 1914 there would be a period of 15 years with ten years of 100 per cent efficiency, instead of 8 years, as in the period previously considered.

(Witness was not permitted, over objection of defendants, to give his opinion as to effect of efficiency on value.)

On the 60,000 acre-foot draft a supply of 100 per cent in ten years out of 15, 95 per cent in one year and 87 per cent in another, is good service. (Witness not permitted to answer whether such an efficiency would be equivalent to full performance or not.)

Taking the full 15-year period, from 1900 to 1914, the average delivery from Cheesman reservoir would be 52,110 acre-feet,
705 without deducting evaporation, or an efficiency of 87 per cent; after deducting evaporation, of 2,000 acre-feet, the efficiency would be 83 1-3 per cent. Witness does not know the efficiency in operation of irrigation reservoirs in Colorado.

(Witness not permitted to answer whether on such efficiency as stated purchasers would be found for a supply of such efficiency on 60,000 acre-foot draft.)

Witness has concluded that the estimate of stream flow should be increased by whatever the loss by evaporation and seepage from Lake Cheesman would be.

Witness was asked whether such additions to the stream flow would give greater available storage, (which was objected to by defendants aand overruled); states that the addition of evaporation would increase the available storage. The reservoir was practically full between May, 1905, and the 1st of June, 1908.

The addition of evaporation would increase all of witness' estimates of storage supply.

It would be necessary to work through each month in actual detail to tell how much the increase would be.

Witness further discusses treatment of evaporation in reference to annual deductions for evaporation.

Witness' tables in exhibit 39 are all worked out without consid-

eration of evaporation, and has not testified as to what effect upon the average draft the matter of deducting evaporation would be.

Taking tables on 40,000 acre-foot draft, exhibit 39, column 8, showing an average delivery of 40,000 acre-feet, witness would not deduct evaporation from that amount; witness does not apply evaporation to the average draft, or that it ought to be deducted from the annual delivery on the 60,000 acre-foot draft.

To apply evaporation to the witness' tables, it would be necessary to go through the charts, figure out evaporation month by month, and apply it back for several years. Evaporation would have to be deducted from the theoretical amount of water in the reservoir, as shown by the tables, and witness has not determined what effect such deduction would have upon the deliveries, and thinks would not justify a deduction of 2,000 acre-feet from the average shown at the bottom of column 8 in the tables in exhibit 39.

The rainfall is a large factor in determining net evaporation, as is also the time of year when the surface of the water is exposed; to get a close result, must consider evaporation month by month.

It would have led to more accurate results if the precipitation had been considered month by month. Applied rainfall factor
706 to the average area in each year separately. Assumed rainfall at 18 inches annually. Witness did apply rainfall at the end of the year and got an average annual area, but did not have an average area for the series of years.

Witness cannot say whether in the actual operation of Lake Cheesman evaporation has been taken care of in the gross figures which appear in tables relative to storage, because the high points and low points might make a big difference.

It would be necessary to go through month by month to make the computation; evaporation must be determined month by month; rainfall could be determined month by month.

After determining evaporation, the stream flows into Lake Cheesman must be corrected to show the total available storage, assuming that the records of inflow do not show the entire flow; does not know exactly what the difference would be; it would be whatever the loss in evaporation was; it might be 2,000 acre-feet, but is making some computations to determine it.

The notes from which exhibits 41 and 42 were made were prepared before exhibit 39 was made. Witness worked out each year by itself before combining them.

Witness noticed the error of 3,400 acre-feet in the first three months of 1911 before counsel inquired about it, and after exhibits 41 and 42 were put in form; also made an error in respect to month of May, 1910, and carried it into tables in exhibit 39 by crediting 6,610 acre-feet which should not have been allowed; the error discovered on rechecking notes; does not know which one was discovered first.

The error in May, 1910, was discovered before exhibit 41 was completed, for it is referred to on page 43 of exhibit 41.

Witness carried over 19,412 acre-feet from 1910 to 1911. If the supposed mistake of 6,000-odd acre-feet in May were deducted, it

would leave approximately 13,000 acre-feet. In 1911 there was delivered out of the reservoir 25,712 acre-feet, and at the end of the year 3,390 acre-feet was carried over. Witness would deduct 6,610 acre-feet from the deliverable quantity, because the last three thousand acre-feet of supply secured during the year came in the last three months after the reservoir was empty.

Witness concludes that he did not discover the mistake as to January, February and March, 1911, until upon cross-examination. Does not recollect on what basis originally arrived at the estimate of 6,610 acre-feet storable in May, 1910, as per exhibit 39.

Witness changed his mind about this storage after looking over the commissioners' records for the two water districts. Witness does not know what other witnesses have testified to about storage in
707 May, 1910. Witness' attention called to fact that Mr. Field's estimate of storage for May 1910 was 6,612 acre-feet, or approximately witness' original estimate, but witness states that he never saw Mr. Field's estimate.

The records of Antero reservoir for the month of May, 1910, show actual storage of 500 acre-feet; witness corrects this and says it should be 1,000. Whether this was allowable storage would depend on the water commissioners' report. On May 7th water commissioner reported as to district 8, that the needs were supplied. High Line was drawing 300 second feet. Footnotes: Weather for week has been cold. Condition of district for irrigation, ground wet.

Read all reports through. Did not refer to the notes on May 7th. Commissioner in district 8 reported that Burlington ditch was drawing 225 second-feet, 200 second-feet of which was storage; does not know what priority the storage was being made on. There is nothing to show that on the reports: storage might have been diverted for a priority older or later than Cheesman. Witness considered that the storage was being diverted for an older priority.

Report of Sunday, May 1st, says, "Weather for week has been rain." Report for May 7th, showed 770 second-feet coming into the district, 570 second-feet used for irrigation and 200 second-feet for storage, and the commissioner reports the needs of the district to be 850 second-feet.

It is possible that this need was for storage purposes, and if it was for a later priority, it would not affect the storage at Cheesman, and it is impossible to tell from the report whether the storage was desired on an early or a later storage right than Cheesman's; nevertheless, witness reached conclusion that Cheesman could not store during the month of May, and that the actual storage made during that month should not be allowed.

During the week in question 4,000 acre-feet flowed into Cheesman, and according to one interpretation of the water commissioners' reports, the whole thing could have been stored, and to this might be added a thousand feet that was stored in Antero that week. Witness' exhibit 41, page 43, should be corrected to read, "From this the conclusion is drawn that there would have been no supply available during the month of May, 1910."

Exhibit 40 is supplemented by exhibit 43. Exhibit 43 contains tables introduced for the purpose of showing reliability of the various

old ditch systems, and such other data as would be necessary to make a comparison of those systems with Lake Cheesman; comparative regularity of the supplies of a reservoir, on the one hand, and
708 a ditch system on the other, may be determined and the requirements of irrigation, as shown by existing systems, can be determined; these things are shown by the tables.

In comparing a reservoir supply and a ditch supply, there is a factor which has an important bearing on the relative value and relative efficiency to such sources which is entirely distinct from reliability in respect to furnishing the same total quantity each year, and that factor is whether you are getting the water with practical regularity; and the element of time when water can be delivered is an important element. If the High Line could take 740,000 acre-feet in April and not get any water after that, it would not be as valuable as a 40,000 acre-foot supply in the reservoir which could be delivered at any time.

Whether a direct flow right would have the flexibility of a storage right would depend upon the characteristics of the two rights compared. A reservoir which could get nothing out of the river would not compare with a direct flow right which did get some water. If we compare a ditch that is able to deliver 40,000 acre-feet during the season with a reservoir which has that much stored and is able to deliver it at any time during the season, the ditch being able to deliver only at such time and in such quantities as the water flows into the headgate, the reservoir supply would have the additional feature that it might be used for partial supply for the system. Cannot say whether that is the way reservoirs are usually handled. All witness had to do *with* have been part of a combined system of direct flow and storage, and have been used to balance the direct supply. A reservoir supply might be used either way.

There is usually sale for irrigation water at some price. All conditions being equal, reservoir water used as a supplemental supply would have its highest efficiency and perform its highest service, but whether it would have the highest value would depend upon local conditions.

There is certain demand for water around Denver; whether it is a demand from people who have money to pay for it witness does not know. There is a great deal of land that ought to have complete water supply. There must be demand for supplemental supply. Has examined reservoirs that were to be used for supplemental supply, and upon the assumption that demand existed for storage water in the vicinity of Denver, but witness' reports thereon have been made for complete supplies.

The Burlington represents a ditch of very intermittent and very poor water rights. There can be no comparison between such a ditch and the Cheesman supply; that comparison was used
709 by witness to show the limits of ditches that had a poor supply.

On an assumption of an annual draft of 60,000 acre-feet, witness had average annual area of exposed surface of water in Lake Cheesman of 432 acres; this covers whole period from 1901 to 1913.

Witness gives years beginning with 1901. The net result of witness' computations was an estimated net loss of 3.8 feet per annum; on that basis witness gets average annual exaporation of 1341.6 acre-feet, but by correcting from month to month, gets 2000 acre-feet. Some months evaporation factor was much greater than others, and if there was more area in those months it would make a corresponding difference in the total amount of evaporation; then there would be greater rainfall in some months than others.

Exhibit 40 shows that from the year 1903 to 1913, inclusive, the Burlington diverted an average of 2 acre-feet per acre; this does not show at what time in the year the water was diverted through the Burlington; in the year 1912 the Burlington is shown to have diverted twice the average amount of water per acre. Witness understands this represents diversion under the adjudication.

There was apparently less average in 1912 than in some other years; might possibly be true that large diversion through the Burlington in 1912 was for the purpose of irrigating increased acreage; 1907 was a high year for the Burlington; water commissioner's report does not give purpose of diversion through the Burlington ditch. Witness does not know whether water commissioners' reports show that the Burlington diverted 20,450 acre-feet in 1912, and that the remaining diversion was for storage. Witness explains his charts in exhibit 40, having reference to comparative supplies of Burlington ditch and Cheesman storage.

The purpose of the comparison between Cheesman supply and Burlington ditch was to show the great differences, the flexibility of the Cheesman right as compared with the Burlington, rather than to prove that the right was as good as the Burlington. The comparative chart shows the great departures from the average deliveries which are in themselves proof of the flexibility. The table does not exhibit on its face the relative power to deliver all the water or the major part of it at times when it is really needed, which is the characteristic attribute of a reservoir, as distinguished from a ditch, and witness had no intention of trying to show that the Burlington right was comparable in value with the Cheesman right.

As to the other comparative tables in exhibit 40, it was the intention to show how direct flow ditches compare with the Cheesman right. These comparative charts and the table in exhibit 40 show the relation of the quantity of water developed per acre irrigated to the average quantity of water developed per acre irrigated as shown at the foot of the column, or is, in other words, a percentage of duty. The percentage shown in exhibit 40 with regard to Lake Cheesman is a percentage of water supply and delivery.

710

The percentages in red on exhibit 39 show the efficiency of Lake Cheesman from the point of view of actual annual delivery; did not consider that percentage at all in exhibit 40.

Has not considered whether reservoir supply could be sold on a basis of an average delivery of 50,860 acre-feet with the understanding to the purchaser that in ten years out of fifteen he was going to get 118 per cent of the average supply. Witness has had con-

siderable experience in irrigation business. Water might be sold on several bases; reservoir water might be sold on a basis of 60,000 acre-feet, purchaser knowing that at certain years he would get less water, or you might sell it on lower average basis and assure the purchaser of a more certain supply. It is an actual fact that irrigationists attempt to sell on the highest delivery that can be made for a reasonable number of years, and the price varies with their ability to make delivery.

In speaking of a guaranteed supply, witness meant that you might give purchaser guarantee of what the supply would be—that is, guarantee an efficiency of 85 per cent of what was purchased, or 100 per cent; does not know of any systems that are handled on a basis of 100 per cent guaranty; on an assumed draft of 60,000 acre-feet, Lake Cheesman would have an efficiency for a period of 15 years of 85 per cent, and in ten out of those fifteen years it would have an efficiency of 100 per cent. That is a very good efficiency. Has investigated no other reservoirs comparable with it, so cannot say and does not know whether there are others.

As shown by exhibit 39, witness contemplates draft upon the reservoir as follows: 20 per cent in June, 40 per cent in July, 30 per cent in August, 10 per cent in September. That is predicated upon use of the reservoir for supplemental supply, otherwise there would have to be a draft in April, May and a small draft in September provided for. Witness has undertaken to make a comparison between a reservoir supply with a draft confined to the months of June, July, August and September, with a direct flow supply furnished from April to November in varying amounts.

This is a comparison of the water right as used in connection with furnishing the entire supply for a system. It does not take in the item of possible additional flexibility. You might hold it
711 back and deliver it all in any specified month. It is simply considering it from the standpoint of how it would develop there an entire irrigation system, as compared with a direct right. The tables are based on a consideration of Lake Cheesman as a sole source of supply, and is of no value as far as the matter of supplemental supply from Cheesman is concerned.

Does not think that a reservoir supply is more efficient than any direct supply can be. It depends upon what special reservoir is being considered, and what special direct supply. The use of water is affected by rainfall. The greater the rainfall the less need of water for irrigation purposes; and during a rainy month, all other things being equal, less direct flow water would be needed. If your water supply was impounded in a reservoir, it would not be necessary to draw on it for that month, but if water supply was direct flow, it must be used that month or permitted to flow down the river, but witness does not think this demonstrates greater efficiency of reservoir supply, because a direct flow ditch does not necessarily use its efficiency when the water for a certain month goes by, because if the right is an early one, there may be water the next month to satisfy demands.

Assuming a direct flow which can always be supplied, and a total

draft of 40,000 acre-feet per annum made, and comparing it with a reservoir the yield of which is 40,000 acre-feet per annum, witness can see no difference in value. Of course, the reservoir would save all that part of 40,000 acre-feet that was not needed, but as compared with the direct flow, this would be of no value if it be assumed that the direct flow gave all the water that was needed.

The water in the reservoir could possibly be used to irrigate more land, but that would have to be worked out for each special reservoir.

If the water supply from a direct ditch is just as regular as the land needs, and has the same amount of water flowing in the stream every month as you would get in a reservoir, it would make no difference whether it was a reservoir supply or a direct irrigation supply, so far as that particular piece of land is concerned. It might be true that the duty of water conserved in a reservoir would be higher than the delay of direct flow water, but against this you must consider losses in delivery of reservoir water.

The local variations in precipitation, and so forth, could be counteracted by a regulation of the reservoir water, when they could not be by regulation of the direct flow, but witness thinks it
712 proper to make a comparison of reservoir and direct flow rights as shown by exhibit 40. The Brantner is as old a priority as there is on the South Platte.

Nothing is shown as to the monthly supply of the Brantner ditch. Exhibit 43 shows when the Brantner could not take water, but does not show the supply that was actually taken. If any ditch on the South Platte can get a certain and reliable direct flow supply, it is the Brantner ditch; the total volume of its decreed priority is 111 second-feet. Witness cannot tell the total amount taken by the Brantner ditch in any one month, but can tell how much it could have taken had it wanted it; the amount which they could have taken was very much more than the amount actually taken; this illustrates the frequency with which direct flow rights cannot be fully availed of. A reservoir could conserve the water and apply it later when needed. A comparison of exhibit 43 and exhibit 40 shows the difference between the Brantner's actual diversion and the amount to which it was prima facie entitled under its decree. This does not indicate to the witness that a direct flow right must have a right to take a greater quantity than it actually needs.

If a reservoir had the right to store the quantity which the Brantner ditch had the right to divert, the reservoir would have stored it and would have taken care of a much greater number of acres than the Brantner; and it is to some extent true that the Brantner must have a priority entitling it to more water than it actually uses, in acre-feet, because it has not the opportunity to store and use only when the need comes. If the Brantner right was a reservoir right, you could irrigate an enlarged acreage, but this does not illustrate the difference between whether one right would be as safe as the other one.

Does not know that the Brantner ditch has a waste-gate delivering water into Big Dry Creek. The water commissioners' reports show the actual diversion into the Brantner, and would not be cor-

rected for any thing that might be turned into Big Dry Creek; the same thing is true with regard to the Brighton ditch. Testimony as to comparison between the Burlington ditch and the Cheesman right and between the Brantner ditch and the Cheesman right, would apply to all the other comparisons made. In reality, the comparison is one between the total yields under the respective rights for the year.

The total quantity of water diverted through the Burlington, as shown by the table of water supply, might include some storage. Practically all the Burlington storage is in the wintertime; there may be some storage in 1912 that should be deducted; this would reduce duty of 4.8 acre-feet, and reduce the average duty of 2 acre-feet, and some such deduction should be made for the water that is run over the waste-gates of the various ditches mentioned.

713 Under the Fulton ditch they raise general crops—alfalfa, cereals, sugar beets, truck gardening; more truck gardening than under any other ditch considered.

Truck gardening requires more water than some other crops. [illegible]mers Independent shows an average duty of 4 acre-feet per annum; the year 1912 was a year of full flow, and the diversion in acre-feet per acre was relatively small, or about half the average, being 2.8 acre-feet.

The larger diversion in earlier years might be excessive. If that were true, the average duty would be less. In regard to Hewes & Cook ditch, in the year 1912, the duty of water was 2 acre-feet, and in 1913, a year of average flow, it was 2.7 acre-feet. The acreage is increased under the ditch.

With a total diversion not exceeding that made in the year 1909, there are about twice as many acres irrigated; the largest diversions in all the ditches seem to be in the years 1907 and 1909, which were years of full flow in the river, and it is to some extent the case that in those years water was taken because the users thought they needed it. The duty is high, and, including those duties in the general averages, raises it slightly.

Explains further exhibits 39 and 40. Referring to diagrams at the end of exhibit 40, in the right-hand upper corner, the summation of percentages is explained as follows: If there was a failure of ten per cent each year for 13 years, the total failure would be 130 per cent. The average failure should be reached by dividing the summation of percentage by the number of years included.

In comparing Cheesman with the Fulton ditch, left out of consideration entirely the performance of Lake Cheesman in 1902, which was a year of low flow. Had no data which to give the performance of the Fulton ditch that year; does not know that there would have been a very marked failure of the Fulton ditch shown in that year, but Cheesman showed good delivery. The effect of the low flow was not felt upon Cheesman until 1903, and a comparison of the performance of Cheesman in 1903 with the performance of the Fulton ditch in 1903 was, in fact, a comparison of Cheesman's year 1902 with the Fulton's year 1903. Cheesman gets the benefit of the whole diagram.

The record of the Fulton ditch for 1902 is not available.

Both the Fulton ditch and the City ditch are later than the Brantner's first appropriation. Did not know that the Brantner's ditch was forced to demand that the City ditch headgates be closed in 1902; that would indicate that at that time there was not
714 much of a supply for the Fulton ditch. Witness corrects testimony on page 2024 to read that 85 per cent is the average efficiency of delivery of Lake Cheesman.

In testifying to the possible loss in transit in the High Line canal for the East Denver Municipal District, witness was not referring to Lake Cheesman. Witness does not know whether High Line would have to be enlarged.

Lands already under the High Line could be served by supplemental supply without enlarging it. Witness' estimate of loss by seepage was based upon assumption that the High Line ditch would have to be enlarged and the "seal" broken; was not testifying as to any loss to Lake Cheesman water through carriage in the High Line.

High Line has been cleaned out so it carries about 600 second-feet, where it originally carried 550. It has been extended for a great many miles. Exhibit 43 was intended to show from the water commissioners' records the ditches in district 2 that were taking water during various weeks of each irrigation season, in order to show from the last ditch taking water what would have been the priorities under those various ditches that have been considered that could have taken water had they desired. For example, if the Brantner Third Enlargement was the last ditch taking water, then there would be certain of those priorities of various ditches that could have taken water.

On page 11 of exhibit 43 witness intended to say that during the year 1912 Cheesman Lake could have taken its full capacity; practically speaking, Cheesman could have stored all the water that entered it that year.

Witness conceives that the Cheesman decree limits to one filling of 79,064 acre-feet. Exhibit 43 is an explanation by weeks of the tables in exhibit 40, as to the conditions of irrigation in district 2. Burlington ditch omitted from exhibit 43.

Burlington ditch has the poorest direct right in district 2, and was included in exhibit 43 merely for purposes of comparison.

Explanation of exhibit 43.

Records show that the Brantner water performs a very low duty. Witness would not expect to furnish 8 acre-feet per acre out of a reservoir to irrigate land, but does not think the low duty of the Brantner water is an indication of deficiency in direct flow rights.

Redirect examination by Mr. Nye:

Water commissioners' records show the amount of water estimated by the commissioners going into the district from various sources and from seepage, and the state of the last ditch that is receiving
715 water supply, and by taking the difference between the amount going in and the amount required, they show what the deficiency would be on the commissioners' estimates.

If a flood passes Lake Cheesman at peak, it would be distributed by the time it reached district 8, or nearly; the peak would be stopped by the reservoir, and even if the spillway of the reservoir was open, the peak flood would be held up by the reservoir. It would take about 36 hours for flood to reach the dividing line between districts 8 and 2 from Cheesman, and the needs of the ditches in districts 8 and 2 are usually determinable 36 hours in advance, and it would be possible to determine whether Cheesman could store a flood by the time the flood arrived there; considered this fact in making determinations. Knowledge of these actual conditions was a factor in witness' mind.

Did not use the Denver hydrographic data in connection with the determination of storable quantities. Witness' testimony should read that up to May 1st in a certain year there was 4,000 acre-feet stored in Antero, instead of "short." Discovered the error appearing in tables in exhibit 39 for the month of May, 1910, and in the notes in exhibits 41 and 42, referring to 6,610 acre-feet, when going over the notes and recopying them; tables had then been fully prepared and printed; did not think it was of enough material difference to make a correction. The following year was a year of short supply. The amount carried forward into the year 1911 from the year 1910 was 19,412, and those figures include the error of 6,610 acre-feet. At the end of 1911 there was 3,390 acre-feet in the reservoir, and there had been stored 6,300 acre-feet. The correction of 6,610 acre-feet would make no difference, because the water was all drawn out for irrigation that year and the water remaining at the end of the year ran into the reservoir after the end of the irrigation season. If the correction for 6,610 acre-feet had been made, there would have been no different result; no part of the error would be carried forward into the 1912 tables.

Exhibit 42 shows that the High Line did not receive any water in the months of May, June, July, August and September, 1902; during October it received 160 acre-feet, during November it received a thousand acre-feet; taking into consideration the conditions of the year in respect to dryness, it is desirable to have water supply in the fall after the close of the irrigation season to be used to irrigate alfalfa and for domestic purpose, and to moisten the soil.

(Plaintiff objected to testimony regarding use of water in late fall for moistening soil. Objection overruled.)

716 It will take about 12 hours for storage at Cheesman to be felt at the head of district 8. The ditch priorities in district 2 between the Brantner Third Enlargement and the Burlington approximate 900 second-feet.

Excluding the Brantner Third Enlargement and the Burlington ditch, the priorities between the two ditches would be 600 second-feet. If the Brantner Third Enlargement was the last ditch receiving water, district 2 would be short 557 second-feet of supplying the ditch priorities prior to Cheesman. The ditches between the Brantner Third Enlargement and the Burlington are the Lower Latham, Union, Side Hill and Fulton, having a total decreed priority of

557.33 second-feet. Including the Burlington it would be 907 second-feet, so that when the Brantner Third Enlargement is the last ditch drawing water in district 2, there are 907 second-feet of unsupplied priorities antedating Cheesman, and there is also the unsupplied priority to the City ditch for 42.95 second-feet.

When the Brantner Second Enlargement or the Fulton First Enlargement are the last ditches drawing water, there are unsupplied priorities of something over 900 second-feet. In considering the commissioners' reports, took into consideration the general conditions existing at the time, as shown by reports previous and subsequent.

In determining whether high flood could be stored, witness took into consideration practical operation, and did not cut out each flood with reference to the conditions existing at the time it occurred and permit it to be stored in Cheesman, nor did he cut down Cheesman supply when the river would drop very low for a day or two; referring to the month of October, 1911, in that month witness thinks there are other rights between the High Line priority and the Antero storage right which would have had the right to store if Antero's storage was lawful; and the fact that the High Line itself was not demanding water in that month, would not legalize Antero storage.

The precipitation in September, 1911, was 78 per cent of the normal, and in October of that year was 35 per cent of normal, and in August of that year was 79 per cent of normal.

The report by the water commissioner of the water coming into the district includes the seepage

Describes again operation of reservoir on 60,000 acre-foot draft. You might sell on a basis of 60,000 acre-feet or on a 50,000 acre-foot basis. The man who bought a share on a 60,000 acre-foot basis would get less water per share and pay less for it. Barr Lake Enlargement had not been increased in 1910; it was completed in 1911.

Mr. Taylor was appointed receiver for the Denver Reservoir Irrigation Company on the 1st or second of June, 1910. Re-
717 ferring to cross-examination on month of June, 1910, the storage being diverted at that time must have been on the Burlington priority for old Barr Lake, or the Oasis reservoir. Witness estimated loss by seepage in Barr Lake of 6,000 acre-feet annually; made no investigation as to evaporation.

Estimate of seepage was made in April, 1908, for The Denver Reservoir Irrigation Company; actually measured the seepage.

Exhibit 40, showing comparison of direct flow water supply with Cheesman supply, was made to show a comparison of the efficiency of supplies; and if equal supply is shown, flexibility is immaterial.

If witness applied his assumed draft on Lake Cheesman to the additional months of April, May and October, it would have affected the delivery of water in the years 1902 and 1903, increasing it slightly; it would have made no difference in the years after 1911.

On rearranging distribution, would take 25 per cent off of the month of April, May and October, and add it to the months of June, July and August, distributing about 20 per cent of that in April and May, and 5 per cent in October. Has not undertaken to arrange percentages for the months of April to October, inclusive, but that would

have saved water that went over the spillway in April and May of one year. In Exhibit 40, the summation of departure of percentages is 156, and that is in relation to 1100 per cent.

The Brantner ditch departure has been 87 per cent.

A short year affects the direct flow right in that year, and might affect a storage right in that year or a subsequent year. The Fulton ditch headgate is below the sewage discharge from the city of Denver.

Several ditches between the Fulton and the sewage; has not assumed in any of his tables that it would require a 8 acre-feet per acre out of a storage supply.

In 1910 some water was run on the enlarged Burlington storage right; enlargement was not completed.

Recross-examination by Mr. Dorsey:

Water diverted for storage into the Burlington ditch in 1910 might have been on the later Barr Lake priorities, subsequent in time to Cheesman; only used the hydrograph in exhibit 37 to show floods at Platte Canon.

Peak floods could not be stored if, looking into the future, they would be needed in the district below by the time they could reach there. The reservoir will catch the peaks of the flood, but if it turned out that the water was then needed below, it would have to be
718 turned out; but it would not have to be turned out if the need had ceased to exist at the time the water could be turned out and reach the ditches.

Does not know of any reservoirs in this vicinity operated in that way.

Witness always noted the actual storage at Cheesman, but did not always include it; commissioners' semi-weekly reports only exist for the years 1911, 1912 and 1913, and for district 2. None exist for district 8; might not have given any effect to these semi-weekly reports, but read them, and about the only consideration given them was to determine when certain ditches were not receiving water. Witness did not know that litigation over fall ground storage was pending until it was mentioned by counsel.

Witness thinks storage could not have been permitted in October, 1902, because water was needed to soak up the ground. Recalls that the September rainfall was 370 per cent of normal for the month, and that was followed by snow in October.

Must use judgment in considering data.

Did not know or take into consideration the fact, if it be a fact, that water cannot be taken for direct irrigation after the first of November. Witness meant to give the figure 907.33 second-feet as the decreed appropriations intervening between the Brantner Third Enlargement and the Burlington.

Did not mean to say that the ditches having these decrees had a capacity to take that much water. In the case of the Fulton ditch, the decree priority is 448.8 cubic feet, and the capacity is 300 statute feet.

The Lower Latham ditch has a capacity of 200 second-feet, and a decree of 287 second-feet; the Union ditch has a capacity of 100

second-feet, and decree of 184 second-feet. There possibly is no Side Hill ditch. In denying Cheesman storage for October, 1911, considered the dearth of rain in August and September of that year, and denied Cheesman storage in October, 1902, although the rainfall for September was 370 per cent of normal, but does not consider the general conditions the same.

The fact that in October, 1911, Antero reservoir was storing and Cheesman was storing, and the intervening direct rights were not drawing water, would indicate that there was not a need of water for direct irrigation during that period, and the fact that there was snow and cold weather during that month would be an additional element; in computing seepage from Barr Lake figured the whole thing upon measurement of the evaporation in April, 1908; measured the current flow at several points below the reservoir. Barr Lake is on an arroya; seepage from the dam is caught in a series of seepage ditches carried into the arroya.

719 The betterment work on Barr Lake was begun in 1909; some work was done in 1909 to correct Barr Lake seepage.

Does not think the decree for enlarged Barr Lake is like the one for the original. Adding more water to Barr Lake and thereby increasing the seepage, would not increase the amount of water that could be taken under the decree. These seepage measurements made in April, 1908, covered two or three days; cannot give the exact date; cannot give the detail now.

The total amount received for Cheesman water ought to be the same whether operated on a 50,000 or 60,000 acre-foot draft.

A. Lincoln Fellows.

Direct examination:

A. Lincoln Fellows. Member of the Public Utilities Commission of Denver, one of the defendants in this case; have been such member for four years and five months. Civil engineer for 27 years. Graduate of Yale College. Practiced profession for the most part in Colorado, but also in the West generally. Practice confined almost altogether to irrigation engineering.

First connected with Montezuma Valley irrigation project, in Southwestern Colorado, for about eight years. After that deputy state engineer. Since then connected with a number of irrigation projects, generally in a consulting capacity; except while district engineer of United States reclamation service, at which time particularly connected with Uncompahgre project and Grand Valley project. During more recent years member of firm, afterwards of company, Field, Fellows and Hinderlider. Also member of Public Utilities Commission.

During my practice have been occupied in a consulting capacity in connection with irrigation projects, among which are: French Land & Irrigation Company, New Mexico; Sheridan Irrigation District, Wyoming; proposed extension Twin Falls project, Idaho; matters in connection with proposed Willow Creek project, Oregon; Two Buttes irrigation project, Southern Colorado; proposed Prowers irri-

gation project, in Colorado; North Fort Morgan irrigation project, in Colorado.

Have given a good deal of study to water supply in South Platte river, commencing about the year 1897, when I was deputy state engineer. Established a number of gauging stations. About 1901 published a pamphlet entitled "Water Resources of Colorado," tabulating information I then had as to water supply of the South Platte. Since that time have made examinations and studies as to flood waters of the South Platte.

720 Have been present during practically all of the hearings in this case, and have heard the testimony of witnesses concerning water rights. Have seen and examined the various exhibits.

Exhibit 44 was prepared as the result of my studies, and relates to Lake Cheesman and other water rights claimed by the company. The studies upon which this exhibit was based were made entirely during the prosecution of this case.

I have listened to the testimony in connection with the water supply available for storage, and have examined the various exhibits relating to that subject. I have also made an entirely independent examination and study in respect to possible storage at South Platte and, carrying that examination one step farther, as to available storage at Lake Cheesman.

General method has been as follows: Year 1913 considered a fair normal year. Have taken use of water for irrigation purposes in Districts 8 and 2 made that year as approximately the amount of water to be demanded for irrigation purposes on the average in the coming years. 1913, practically to all intents and purposes, a year of normal precipitation. Precipitation records appear in Exhibit 44, page 1, table 1.

1913 was a good year as to flow, as shown by Exhibit 44, page 3, table 4. This table prepared from all available information as to the flow of the South Platte river at South Platte. Comstock's table of flow, corrected for Lake Cheesman storage, used where available. Some years estimated to some extent. Purpose of table to show general character of years, from which it appears that the discharge in 1913 was 113 per cent of normal. Back of 1899 the data was so incomplete that percentages were not figured. An additional reason for using the year 1913 was that it was the last year with complete records, and that the records furnished by the commissioners of the various districts and the division engineer for that year were the best that I was able to examine of those on file in the State Engineer's office. Therefore I assumed that the use of water from the river for irrigation purposes in 1913 might fairly be assumed to be the average use of water during the coming years.

Next I took the actual discharge of the South Platte river at South Platte, as nearly as I could arrive at it, during the 14 years from 1900 to 1913, inclusive; also the discharge of the south fork of the South Platte at Lake Cheesman; I considered those as being the probable discharges of the river at those points in any future period of fourteen years.

To those stream flows I applied the demand upon the river as shown by the uses of water in 1913, and so arrived at what I

thought to be a fair conclusion as to what water might be stored in Lake Cheesman.

721 Method further explained.

On the whole, I concluded that 1913 was the best year I could find for this determination, and so used it.

Exhibit 44, page 2, table 2, states yearly flow and monthly averages of south fork at Cheesman, taken from reports furnished by the Water Company. Same page, table 3, shows relation of flow on south fork to flow for same months and years at the forks. By it the average yearly flow at Cheesman appears to be 44% of the total flow in the stream at South Platte. Have used these percentages to fill in the incomplete months on table 4, page 3, Exhibit 44, indicated by stars. Knowing flow at Cheesman but not at South Platte, the latter discharge has been filled in by proportion.

Exhibit 44, page 4, table 5—discharge of south fork at Cheesman, taken from records of the Water Company on file in State Engineer's office.

Exhibit 44, page 5, table 6, from water commissioners' reports. I assumed that entire inflow from St. Vrain and Big Thompson was required to be sent down to District No. 1; but the seepage in entire District 2 assumed as available for irrigation purposes to the ditches within the district.

Exhibit 44, page 6, table 7—inflow from side streams and seepage in Water District No. 8; amounts shown being those reported by the water commissioner, except those indicated by a star, which are estimated.

Exhibit 44, page 7, table 8; similar information for District No. 2, covering inflow from Clear Creek and seepage, as reported by the commissioner in general way throughout the entire year. In this table seepage includes inflow from Denver sewers.

Exhibit 44, pages 1, 1*a* and 1*b*, dealing with precipitation at Denver and Lake Cheesman.

Exhibit 44, page 8, table 9; diversions for irrigation in District No. 8, as reported by water commissioner, also the quantities decreed to the respective ditches prior to the first decree of Lake Cheesman.

Exhibit 44, page 8, table 10, shows totals for District No. 8 for same year and same ditches, as reported by the water commissioner.

Exhibit 44, page 9, table 11; same information for District No. 2, as reported by the water commissioner; this table corresponding to table No. 9.

Exhibit 44, page 10, table 12, presents same information, derived from water commissioner's report, in respect to District No. 2 as does table 10 in respect to District No. 8. On this table question marks appear where the water commissioner has reported the acres

722 actually irrigated to be in excess of the acres irrigable.

Exhibit 44, page 11, table 13—diversions of the Water Company near Platte Canon, as reported by the Water Company. Figures obtained by me from the company, for the most part, at the time the valuation was being made by the utilities engineers. Those for November and December have been obtained since.

Exhibit 44, page 12, table 14; compilation of data shown in preceding tables. Said table further explained. For the months of Janu-

ary, February, March, April, November and December the diversions of the Water Company are set down as demands on the canon, because the intakes of the Water Company are so high up on the stream that the inflow from seepage and small streams cannot be utilized for these particular diversions. For the remaining six months the deficiency of the inflow from seepage and tributaries below the irrigation diversions is added to the amount diverted by the Water Company, as giving the total demand upon the canon.

Exhibit 44, page 13, table 15, shows available storages at Lake Cheesman, applying the demands upon the canon, so determined, to the stream flow, for the year 1900 to 1913, inclusive. In making this determination demand at the canon for each month is deducted from flow of the South Platte at the canon, and the excess, if any, permitted to be stored at Lake Cheesman, to the extent of the flow in the south fork at Cheesman, as shown by the column relating to the discharge of the south fork at Cheesman. If the demand at the canon equaled or was greater than the discharge at the canon for that particular month, no storage was permitted.

Exhibit 44, page 13, table 15, further explained.

Exhibit 44, page 20, table 16, is merely a summation and an average of the conclusions of the preceding table relative to the available storage in each year, limited, however, by the total quantity allowed to be stored in each year by the present decree, to-wit, 79,064 acre feet.

Exhibit 44, page 21, table 17—evaporation and other losses at Lake Cheesman, explained.

The vertical loss in each month determined by taking the amounts given in Wilson's Irrigation Engineering for the evaporation at Cheyenne, Colorado Springs, Denver and Pike's Peak, and taking the average of these for the evaporation at Lake Cheesman. Evaporation at Cheyenne, Colorado Springs and Denver would probably be somewhat too high, so the Pike's Peak record was taken into the average, upon the assumption that this would balance the excess. The average for the four stations mentioned is 57.9 inches in the year,
723 and I have increased the amount to 61.25 inches to include other losses, such as water used for generating plant, certain seepages through the gates, and a little loss through the cracks in the hill.

Exhibit 44, pages 22-28—tabulation of operating results during the fourteen year period, on an assumption of an annual draft of 40,000 acre feet, and upon the estimated possible storages shown in the preceding tables. Evaporation for each month determined according to factors shown in table 17, page 21, Exhibit 44, applied to an exposed surface estimated by taking the amount in the reservoir at the first of the month, the amount in the reservoir at the end of the month, and averaging them, thus finding approximately the average area for the month. The amount of evaporation deducted each month, except in those months when the reservoir was full and additional water was available under the appropriation, when the amount of evaporation was not deducted from the amount in the reservoir, but the reservoir was allowed to fill and the evaporation charged up against the appropriation as a storage.

Said tables further explained.

I have not yet reached a definite conclusion as to the proper draft under which to operate Lake Cheesman to show the highest efficiency and utilization of this supply.

Exhibit 44, page 3, table 4: the figures given for individual months of the years 1887 to 1899 enter into the averages for the respective months at the foot of the columns, therefore they enter into the determination of the monthly and yearly mean, with which the years 1900 to 1913 have been compared to ascertain the yearly percentage.

The Cache la Poudre enters the Platte at the lower end of District No. 2, and its discharge is available in District No. 1, but not in District No. 2. The amount discharged from the Poudre is not reported upon by the water commissioner of District No. 2.

The method I employed to estimate possible storages at Lake Cheesman was as follows: I ascertained the discharges for the series of fourteen years immediately preceding the year 1914; I also ascertained the amount of water used, as reported from various sources, in the year 1913; from those reports I ascertained the demand on the canon for the year 1913. I assumed that the year 1913 represented fairly the demand which might be expected on the average in the future; accordingly I used the demand which I had ascertained as a constant which I applied to the quantities which had been discharged in each of the series of fourteen years which I have just mentioned, arriving in that way at what might be called the expected available storage for any subsequent period of fourteen years.

724 Exhibit 44, page 22, year 1900: I assumed that the reservoir would at the beginning of the year be filled to one-half its capacity. That is because the year 1899 was known to have been a year of good supply and the reservoir could probably have filled. At any rate there would probably not have been any shortage at the end of the year. The assumption was made that the reservoir was half full as a rather more reasonable assumption than either that it was full or that it was empty.

There is a considerable variation in supply in different years, some years being very deficient in supply and other years having a surplus over the average.

Referring to table 4, page 3, Exhibit 44: I had not before noticed that the year 1908 as there given appears to be the lowest in percentage. I had thought that 1902 was shown as the lowest. But these tables serve to show the wide variations in the discharge of the stream in different years. The demand, however, is assumed to be fairly constant quantity.

This period of fourteen years is used as the period of supply because it is the longest period that we have with anything like satisfactory records as to the flow in the streams. It is practically impossible from the records to get anything like a satisfactory average as to the demand on the water in the streams, for the reason that the commissioners' reports are very incomplete up to within the last two or three years; in the year 1912 the conditions were abnormal—exceedingly so; in the year 1914 they were abnormal; in the year 1908 it was the opposite way; in the year 1911 there were features

that were hard to be considered or to adjust; "and consequently the year 1913 was assumed as the best information that could be obtained as to the average demand upon the stream."

As to stream flow, it was considered that fourteen years should be sufficiently long to give a fairly accurate idea as to what might be expected; it should furnish a fair average, and should give fairly representative information as to what might be expected for any similar period in the future. This series of years covers years of deficiency and years of full supply, and years of practically every type that need be considered in a computation of this kind.

Exhibit 44, pages 29-35: tables showing operation of Cheesman on 50,000 acre foot annual draft, according to assumptions and estimates of Fellows. These tables explained.

In the tables relating to the 40,000 and 50,000 acre foot draft the calendar years are not given, but the years of the fourteen year period are numbered; the calendar year in each instance can be obtained by subtracting 1 from the number of the year given in the table, the series in each instance starting with 1900.

725 In the tables relating to the 40,000 and 50,000 acre foot draft respectively, the assumptions are the same as to possible storage, as to percentages of withdrawal in each month, and as to the factors of evaporation.

Exhibit 44, page 39 is a diagram showing water surface area in relation to the contents of Cheesman. This was used in determining amount of evaporation.

Exhibit 44, page 37, shows data upon which my estimates as to the factor of evaporation and other losses in each month was based. This factor was applied to the average area in each month, obtained by taking the mean of the contents at the beginning and at the end of the month.

Exhibit 44, page 21, table 17, is a tabulation of these monthly factors.

Exhibit 44, page 36, is a table of comparative efficiencies under the assumed draft of 40,000 acre feet and 50,000 acre feet per annum, respectively. Exhibit 44, page 40, is a diagram showing the same thing. Undoubtedly the use of the water would not be exactly as it is represented in this diagram by the seasonal demand. The owners of stock in the reservoir would undoubtedly be more careful, and would not use the water on the basis shown on this diagram. I have placed the curves of seasonal demand on this diagram in the same way for each year, because it would be impossible to determine just what basis the irigators would use in distributing the amounts of water in the reservoir in those years when there was not sufficient water to supply the total demand. My conclusion is that the 40,000 acre foot basis of delivery is the one that should be considered, as offering what might be called a fairly guaranteed supply of water.

According to my estimates and assumptions, the reservoir would show an annual draft of 35,000 acre feet, 100% efficiency; 40,000 acre feet, 95.6% efficiency; 50,000 acre feet, 91% efficiency. I concluded that it would probably not make very much difference to the seller whether he sold on the basis of 40,000 acre feet delivery

with 95.6% efficiency, or on the basis of 50,000 acre feet delivery, with 91% efficiency. I assumed that the seller would prefer to be more nearly on the safe side, and would make the sale on the lesser draft, if the amount to be received were not material. A number of things would have to be considered. The market would have to be obtained. On the greater draft sales would have to be made amongst a greater number of people, probably, and upon a little different basis—that is, a basis of less efficiency; and the seller would be unable to say that the amount to be delivered was every year the amount contracted for. Taking these things into consideration, and also the probably greater length of time required to sell the water on
726 the larger draft, and the consequent greater overhead charges and possible discount, I concluded that the amount which would be received on the 50,000 acre foot basis would probably not be more in the aggregate than upon the 40,000 acre foot basis; that the return to the seller would be the same in either event.

Exhibit 44, page 38, shows my conclusions as to the water rights of the company, including my valuation upon each. As to Marston Lake, have assumed that actual diversions of the Water Company near Platte Canon, as shown in Exhibit 44, page 11, table 13, for the months of January, February, March, April, November and December could be stored therein, taking only as much of the April diversion as was necessary to fill Lake Marston to its capacity.

Rough and Ready Mill Ditch, merely assumed to make more safe and available the Platte Canon ditch rights. No separate value assigned.

I arrived at that conclusion as to the value of these water rights. Have in the past been in touch with the value of water rights, and made many estimates as to the value of irrigation supplies. Have made a study of the combined value of land and water, when used for the growing of crops, along the valley of the Platte. Have had personal experience in relation to water values in various systems along the Platte, and have examined into the question. These investigations have in this locality covered practically all of the past fifteen years.

(Witness' statements as to value of water rights objected to, because he has not been shown to be competent to express such an opinion. Objection overruled. Exception.)

My conclusion as to values is set forth in Exhibit 44, page 38.

As to Lake Marston, considered that probably about 2 acre-feet per acre per annum, measured at the reservoir, would be required by the irrigators, the purchaser standing the loss in transit between the reservoir and the land.

Exhibit 44, page 38, group "A": the item following Marston Lake reservoir relates to summer flow from Water Company's sources of supply near Platte Canon, based on actual diversions made in May, 1913, as shown in Exhibit 44, page 11, table 13, from which deduction is made for the Lehow right (3.14 second feet) and for Hugens and Shellabarger (3 second feet), leaving 80.16 second feet as the total amount of water available for sale as direct flow rights during the irrigation season. I valued this upon the direct flow basis, as-

suming that the water would in the main have to be transferred to other ditches; that they would have to go through the process of having the point of diversion changed; that that portion of
727 the 80.16 second feet not now decreed would have to obtain decrees; that they would have to go through all of the legal routine necessary to make that water available for transfer and suffer possibly certain discounts because of the estimated loss in seepage etc.; that purchasers would have to be found for the water; that all that the Water Company would have to sell would be a certain claim for water, at the points where it is now diverted; that the ditches for conveying the water to other lands would have to be found or constructed, and difficulties of that kind eliminated. By considering all of these details I arrived at my conclusion as to what the water was in my opinion worth, to-wit, $2,000 per second foot, giving a total for the 80.16 second feet of $160,320, for irrigation purposes. Adding this to the value already estimated for Marston Lake makes a total for group A, page 38 of Exhibit 44, of $754,170.

Exhibit 44, page 38, group "B"—Bear Creek and Turkey Creek rights: have assumed that water yielded by these rights could be utilized in existing reservoirs belonging to the Water Company, to-wit, Harriman reservoir, Soda Lakes reservoir, the Bergan reservoir. Have therefore assigned values as storage water. I applied a value of $35 per acre foot to a yield of 6,840 acre feet; assigned a higher value per acre feet here than to the water in Marston Lake, because in my opinion Bear Creek and Turkey Creek rights are in a somewhat better position from a legal standpoint than the storage rights upon the South Platte. They are already decreed for storage, while the South Platte rights are not. Also considered fact that lands to be irrigated are nearer these sources of supply. All of these estimates are based upon irrigation use, and an assumed transfer from domestic supply to irrigation use. As to group B, it was my opinion that water could be utilized practically upon basis of about 1¾ acre feet per acre per annum, there being less loss in transit than would be the case with South Platte water. The values were assigned upon the quantity measured at the outlet of the reservoir.

Exhibit 44, page 38, items 5 and 6—old Denver City right and Mississippi Street galleries, considered together: assumed old right merged with Mississippi Street galleries claim; as to quantity, took rate at which water pumped in 1910, to-wit, 21.2 second feet, that being the maximum monthly average in that year; considered this as a right without a decree, simply a claim; subject to the various discounts spoken of above, connected with transfer and changing point of diversion, and losses and expense connected therewith, and especially the fact that water is derived from infiltration galleries; such galleries of perishable nature. What the Water Company could sell and transfer would be simply the right to produce water by means of the infiltration galleries. The water was practically of no value, so far as transfer for irrigation purposes was
728 concerned, therefore gave it nominal value of $100 per second foot; meaning by that, over and above overhead charges

necessary while finding market and disposing of it to possible purchasers.

Exhibit 44, page 38, item 7—Cherry Creek right; considered in the same way. Assumed possible diversion of 8 second feet and applied nominal value of $100 per second foot.

Exhibit 44, page 38, item 11—Highline ditch right: Present market value applied; differs from items 5, 6 and 7 in that ditch exists for diversion, and a proportionate interest in it passes with the right.

Exhibit 44, page 38, item 12—Lake Cheesman: to the 40,000 acre foot draft, assumed by me as being the most practical draft for sale and delivery for irrigation purposes, have assigned a value of $35 per acre foot; this upon assumption that 2 acre feet per acre per annum, delivered from outlet of reservoir, would be required for the irrigation of any lands likely to purchase that water, under any of the existing ditches near or below Denver; assumed the most likely possibility for the use of that water would be in connection with the Highline ditch; assumed delivery at the outlet of the reservoir, purchaser to stand losses of evaporation, seepage, etc., between that point and his land; and assumed that the gross cost of the structures required to make the various supplies available should be deducted from the gross value for irrigation, to arrive at the net value for irrigation. The gross values which I have assigned in Exhibit 44, page 38, include cost of structures. The value to be deducted from this on account of structures should be, in my opinion, the gross value, without deduction therefrom on account of depreciation. It seems to me that the structures necessary to produce the water should be required to be in perfect condition, or practically in a new condition. I have limited my valuations to what I thought the farmer in this locality could afford to pay.

(Exhibit 44 offered and admitted.)

Cross-examination:

In estimating demand on canon, which must be satisfied before Cheesman can store, I considered the demands for Districts 8 and 2 specifically. As to districts below 2 I assumed that a certain amount of water was necessary to pass from District 2 to District No. 1 to supply priorities below. I assumed that those priorities in District No. 1 earlier than Cheesman would be satisfied by the inflow from the St. Vrain, the Big Thompson and the Cache la Poudre. I assumed that the inflow from those streams would in general
729 supply the demands of ditches lower down. I considered that a fair and reasonable assumption.

For District No. 2 I used as a basis the diversions of the ditches earlier than Lake Cheesman, except the Lupton Short Line, which has a decree later than Cheesman's first decree, but prior to Cheesman's last decree. Cheesman's first decreed priority is for a little over 30,000 acre feet; its last decreed priority for 48,373 acre feet, and the Lupton Short Line intervenes.

As to the other ditches in Districts 8 and 2, the demands as esti-

mated by me were the amounts as reported by the commissioners as used for irrigation during the year 1913, without passing upon the question as to whether it was properly or economically used or not.

Generally speaking, the need of these ditches is the amount of water that can be and is beneficially used, within the limits of the decrees of the respective ditches utilizing the water. Limited by the quantities specified in their respective decrees, I would say that such ditches are entitled to divert at all times what the commissioners of the respective districts said that they were enitled to divert. Unless there was a surplus of water in the stream the commissioner would not allow them to take more water than their decrees called for, and he might very properly limit them to amounts considerably less than their decrees. If the water is being wasted, I think the amount should be decreased at the headgate. Allowing water to run in at the headgate and out at the other end of the ditch might possibly be a waste if it could not be used by other ditches below, but if nobody was injured by carrying water through the ditch, and it was returned to the stream, it would not be a waste. Where such a process as that is indulged in by ditches, the quantity of water thus taken in at the headgate and later allowed to flow back into the stream should be counted and included in the diversion reported by the water commissioner. Sometimes more water than is actually used for irrigation must be run through a ditch to keep up a proper head to supply those at the lower end, but if that is done to excess it is a waste.

The water commissioner has not the authority, and ordinarily has not the data, to determine whether a wasteful use of water is being made by the ditches. I think other users of water are justly entitled to relief against a ditch or ditches which are diverting water and spreading it upon their acres in quantities in excess of that which is really needed for the purpose of raising their crops.

In this case I have taken as the absolute measure of the needs of the ditches the diversions made by them in the year 1913, as reported by the water commissioners of Districts 8 and 2. I
730 have used those figures as the measure of what those ditches will be entitled to divert in the future, as against any claims for storage at Lake Cheesman.

Having so determined the total demand, I ascertained the proportion thereof which must be satisfied by water flowing at Platte Canon as follows: (1) I ascertained the total quantity of inflow into District 8 from sources other than Platte Canon, that is, from seepage and from the various tributaries entering the district; (2) I ascertained the total quantity of inflow into District No. 2 from sources other than water flowing past Platte Canon, that is, from seepage, from the sewers of Denver and from the various tributaries; (3) from the quantity of inflow so determined for District No. 2 I deducted the inflow from the St. Vrain, the Cache de Poudre and the Big Thompson, because I considered that needed for District No. 1; (4) all of the balance remaining of inflow and accretions from tributaries and seepage in Districts 8 and 2 I deducted from the total needs of the ditches determined as above; (5) the balance

remaining after making that deduction was assumed by me to be the demand of those ditches in Districts 8 and 2 upon the stream flow at Platte Canon, which must be satisfied before Lake Cheesman can store. I made this determination for each of the months April to October, inclusive.

Having so ascertained the demand for each month upon the canon, expressed in a total quantity of acre feet, I then examined the monthly discharge at the canon for each of those months, and if the discharge for a particular month was in total quantity less than the total quantity of the demand for said month, thus arrived at, I determined that for that par-icular mon-h there could be no storage at Lake Cheesman. But if there was an excess of discharge in acre feet over the demand in acre feet for that month, I estimated that Cheesman could store said excess, to the extent that it was flowing in the south fork of the South Platte at Cheesman.

In determining the demands I added to the irrigation demands the Water Company's diversions below the canon.

The determination of the needs of these ditches is based entirely upon the reports of the water commissioners as to the actual diversions made in the year 1913. The deductions which I made from the total gross amount of those needs, on account of inflow from tributaries and seepage, are based absolutely upon an adoption of the figures for such inflow and seepage as reported by the water commissioners for the year 1913.

The real needs of a ditch for direct irrigation are dependent upon many different conditions and considerations, such as precipitation, temperature, etc., which have an effect upon the quantity of
731 water really required. Therefore the real needs of particular ditches for the irrigation of identical acres vary from year to year.

The flow in the various streams, both in the South Platte itself and in its various tributaries, is subject to great variation from one season to another. The flow varies greatly from year to year, even from month to month, and sometimes from day to day. That is characteristic not only of the South Platte, but also of the various tributaries which enter it in Districts 8 and 2. The quantity of water discharged into Districts 8 and 2 by these various tributaries has a material effect upon my determination of the demands of these ditches upon Platte Canon. These tributaries come from different drainage areas, having their heads at different places along the mountain range, and are subject to different conditions, as to snowfall in winter and rainfall in summer; as to weather, temperature and other conditions at the headwaters of the various streams, which affect their flow. Nevertheless I have taken and used as a constant quantity the inflow of these tributaries as reported by the water commissioners for the year 1913. The water commissioners of Districts 8 and 2 did not measure the inflow of these various tributaries; they merely estimated them. There are no gauging stations. The water commissioner merely estimates and reports in his weekly report the rate of flow of these various tributary streams on the date of his report. Using the rate of flow so reported as a factor, and assuming that the water flowed at that rate during the preceding

week, I have by computation determined what would be the total discharge of the tributaries in acre feet.

As to seepage also, the quantities reported by the water commissioners are mere estimates, not dependent upon any measurement at all. The water commissioners usually estimate seepage as follows: First, they take the sum of their estimates of the inflow into the district in the main stream and of the accretions in the district from tributary streams; second, they take the sum of their estimates of outflow from the district in the main stream and of diversions by the ditches in the district; third, they deduct the total inflow, so determined, from the total outgo, so determined, and the remainder they call seepage. In the water commissioners' reports the quantity of seepage is expressed in second feet. For the purpose of my computations here I have converted it into acre feet. The water commissioner in estimating seepage is, I think, guided to some extent in his judgment by what does actually return to the river between certain heads of ditches, but I do not know that any such condition occurred in 1913 as would enable him to get that information.

732 The State Engineer made no seepage measurements until late in the year 1913. Prior to that time none had been made for a number of years. The statements of the water commissioners in their reports for 1913 concerning the rate at which water is returned into the main stream by way of seepage are estimates only, and not based on measurements, or on any very complete data. The water commissioner's reports as to inflow to and outflow from his district in the main stream are probably estimates, although the water commissioners of Districts 8 and 2 ought to have had some knowledge of gaugings at Platte Canon and Denver.

There is no gauge station at the lower end of District 2. Even where gauge stations exist, I do not think the water commissioners go to read the guages, or report the inflow and outflow by such readings. The water commissioners estimate the stream flow, even in the main stream, and with great frequency their estimates are far from being correct.

Their visits to the tributaries for the purpose of making an estimate of the flow therein are, I think, likely to be rather infrequent. There are many diversions for irrigation purposes from the tributary streams before they reach the main stream in Districts 2 and 8. The inflow into the main stream from these various tributaries is very materially affected by such diversions, and those diversions, in turn, are influenced from time to time and from year to year by the circumstances and conditions surrounding agricultural operations and irrigation processes. The quantity diverted from these tributaries is not a constant quantity from year to year, and that circumstance certainly affects the quantity of water which remains in the various tributary streams and flows into the main river.

The amount of accretion to the stream from the sewers of Denver is estimated by the water commissioner of District No. 2. It is not a constant quantity, but varies materially at different seasons and under different conditions.

I have expressed my demand upon the canon in terms of acre

feet for the month. Unless in the course of a particular month the aggregate flow at Platte Canon has been such as to furnish that certain number of acre feet in total quantity expressing my estimated demand for the month, then, according to my method, there could have been no storage at Lake Cheesman during that month. But if the discharge at Platte Canon for the month, expressed in acre feet, has exceeded the number of acre feet estimated by me as the total demand on the canon for the month, then I have permitted that excess to be stored at Lake Cheesman in that month, to the extent that it was flowing in the south fork of the South Platte at Lake Cheesman.

733 This method prevents Cheesman from storing during periods of flood unless the total discharge for the month, expressed in acre feet, exceeded the total of the demand for the month, likewise expressed in acre feet, no matter what might have been the rate of flow in the river at the time the flood was occurring. Nevertheless I adopted this method, because I thought there were balancing features on the other side.

Storage reservoirs really do get a substantial part of their supply from the summer floods. It is in the main true that direct supply ditches are not entitled to take water and cannot use it beneficially at any greater than a certain rate, no matter what may be the rate of flow in the stream. They are in the first place limited by the rates of flow specified in their decrees; secondly, they are limited by the capacity of the ditches to convey; and in the third place, even though the decree of the ditch specified a greater rate, and even though the capacity of the ditch permitted a diversion of a greater rate, nevertheless, the ditch would be limited to a diversion of only such quantity as could be beneficially applied, no matter how great the flow might be passing down the river. Those are proper limitations, and a ditch would be subject to them even at times of flood, and even though previously it had not been receiving its full quota because of low water in the stream. If in a month of thirty days, the river had been low for the first twenty-five, and there came a good sized flood in the last five, but the total discharge in acre feet for the month had been less than the total quantity in acre feet of my estimated demand for that month, I do not say that because of the shortage earlier in the month the ditches would be entitled to make up out of that flood the deficit from which they had previously suffered, so that they might obtain as nearly as possible their full quota of acre feet for the month.

I think it is true that the water commissioner in each district always looks at the ditches in his district with rather an eye of generosity. He is going to be liberal with those ditches. He is a kind of a local advocate of his particular ditches, as against diversions in other districts.

Storage at Cheesman might occur on the peaks of floods even in a month when the total discharge, expressed in acre feet, was less than the total quantity of demand of ditches as estimated by me. It is highly probable that such floods will occur. They occur with some frequency. We must bear in mind that a flood at Cheesman, or high up on any of the tributary streams, will be flattened out to a

very great extent before it has supplied the needs of the ditches below.

If there were floods in the early part of a certain month and low water later, so that for the entire month the total discharge,
734 expressed in acre feet, is less than my total estimated demand for said month, likewise expressed in acre feet, nevertheless, if the rate of flow during the days when the flood continued was such that, in addition to supplying the needs of the ditches, there was an excess which Cheesman could and did store, such storage would be proper. It is not only possible, but probable, that such a condition might arise. But under my method of determination, possible storages of that sort are eliminated. I have offset against possible storages: (1) the flattening out of the river before reaching the ditches, as mentioned above; (2) an assumption that the recorded stream flows at Platte Canon are somewhat—I do not know how much; a few percent—in excess of the actual supply.

These are the figures reported by the hydrographers and used by me, but it is my experience that those who measure water generally get a larger quantity at a station where the stream bed is rocky or filled with boulders than they do where the stream bed is smooth. I say this, although these figures are the result of actual measurements made by gauges and by trained engineers and hydrographers experienced in such matters. Although I regard these measurements of the stream flow, made by trained and educated hydrographers, and based upon their own readings of the gauges and other measuring devices, as inaccurate, and therefore to be decreased by a certain percentage, nevertheless I accepted the statements of the water commissioners concerning stream flow, which are mere estimates, at their face value, for the reason that the reports from the water commissioners are all the information we have regarding that particular point, and I assume that their errors will offset one another.

A great many of the recorded measurements of the stream flows at these stations have been made by United States hydrographers, others by those of the state. I think they are generally accepted as the best and most accurate information obtainable. I base my conclusion that these measurements are uniformly high upon my own observation regarding measurements in rocky channels; that they are almost invariably a little high. I think, on the average, they should be discounted about five per cent. But that would depend upon whether the hydrographer himself had applied any factor of correction. As to these particular measurements, I do not know that no factor of correction was applied, except as to measurements which I myself made for two or three years in the period between 1898 and 1905. I did not apply a factor of correction.

Prior to 1900 the measurements were made at Deansbury; afterwards at South Platte. The stream bed at South Platte is
735 rather a gravel and boulder bed than what is generally regarded as rocky. As to the measurements at South Platte, the necessary deduction, assuming that no factor of correction had been applied, might possibly be as great as five per cent. I have made no specific deduction.

If it should turn out that the actual diversions of the ditches in 1913 did not represent their actual needs for the beneficial and proper irrigation of the acres under them; or if it should turn out that the water commissioners' statements as to the quantity of those diversions for that year were erroneous; or if the water commissioner was mistaken in his estimate of the quantity of inflow into his district from tributaries, from seepage and from sewage; the result of a mistake in any of these matters, as I have already testified, would have a material effect upon the propriety of my determination relative to possible storage at Lake Cheesman. Even though no such mistake had been made, if, as a matter of fact, the year 1913 did not fairly represent the average year in respect to conditions affecting irrigation, that also would materially influence the justice of my conclusions.

After having estimated the demands of the ditches upon the canon I applied that determination to the stream flows. The stream flows so used are given in Exhibit 44, page 3, table 4, for the main stream below the forks, and in Exhibit 44, page 4, table 5, for the south fork at Cheesman. Where in any particular month the excess of discharge at the canon, in acre feet, over the demands, in acre feet, for the month, of ditches was less than the discharge for the month, in acre feet, at Cheesman, nevertheless Cheesman was permitted to store only the quantity of such excess.

I assumed that the year 1913 was a fair year upon which to base these estimates; I assumed that the actual diversions in that year represented the average demands; that the conditions surrounding and influencing the quantities of such diversions were as good as or better than average and normal conditions. I assumed that the accretions to the main stream from tributaries and seepage in Districts 8 and 2 in 1913 represented what could reasonably be expected as the quantity of such accretions in each and every year. I assumed that the year 1913 presented conditions which would render such accretions from seepage and tributary inflow in that year as great as, if not greater than, the average.

In this respect precipitation is an important consideration. The more precipitation, the less diversion from the stream by the irrigator. The precipitation at Denver would fairly represent the average precipitation in Districts 8 and 2. As to precipitation, it
736 is necessary to take into consideration not only the total quantity for the year, but also the quantity in each month, and further to consider the particular month in which the growing of crops is occurring.

The high precipitation which occurred in the month of December, 1913, should be excluded from consideration. Crops are growing and have more need of water in the months of May, June, July and August, principally the months of May, June and July, and the precipitation in August may benefit materially in maturing crops. The precipitation in September is of less importance. As appears from Exhibit 44, page 1*b*, in 1913 the precipitation in April, May, June and August was much below normal, and in July slightly above; the normal being 1.62 inches, the actual in that year 1.76

inches. That situation would increase the diversions of ditches for irrigation purposes above the normal. In the months April to August, both inclusive, 1913, the total quantity of precipitation was about 23% below normal.

In years of abundant and constantly maintained flow the temptation is great, and the practice exists, for ditches to divert really more water than they need. If the year 1913 was a year of full flow in these crucial months of irrigation and of the raising of crops, and the flow was well maintained, it is very possibly true that the diversions by these ditches were made in really greater quantities than their needs actually require. Nevertheless, my point of view was that the actual diversions for 1913 would fairly indicate the demand in the future, because of a possible increase in needs in future years under those ditches, and possible changes in some of the decrees. The condition of the stream flow which existed in 1913 doubtless offered a temptation to the ditches, and as a consequence the ditches very likely yielded to the temptation, to divert more water from the river than they actually needed for that year.

Exhibit 44, page 3, table 4, shows that in 1913 the discharge of the stream in the months of July, August and September was considerably above the average. The months of May and June are somewhat below the average, but not by as great a percentage as the other months mentioned are above the average. Moreover, in May and June, 1913, the precipitation was much below the average. The saturation of the ground from the previous year would have a material effect upon the amounts diverted in the months of April and May, but possibly not later than that.

The weather, temperature and the existence of dry hot winds have an effect upon the quantity of diversions in the direct flow
737 ditches. The conditions would also affect the question as to whether ground saturation would be carried over from one season to the next.

As shown by Exhibit 44, page 1, the precipitation in September, October and November, 1912, was above normal, but at the end of November it began to drop off, and in December it was 25% below normal and that January, 1913, was below normal, February above, and March approximately one-half normal.

As to the diversions of the ditches in 1913, I took my information from the commissioners' reports, mostly from the commissioners' note books that are on file. These are the commissioners' field books, which are filed at the end of the season in the State Engineer's office.

Exhibit 44, page 8, table 10; amounts compiled from water commissioners' annual report. Most of this work done by two assistants. I examined and checked them in places, but some of these details I cannot answer offhand. I think the data tabulated in table 9 is taken from the filed books and that in 10 from the water commissioners' annual report.

In these tables embraced in Exhibit 44 I have to a very large extent relied upon the accuracy of the tabulation by my assistants. I do not really know from what exact sources my assistants have

taken these figures, except that they were taken from some of the commissioners' records.

In determining ditch diversions the water commissioner or his deputy should visit each ditch practically every day. As to whether in actual practice they really do so I cannot say.

I was deputy state engineer under Mr. Field in 1897, 1898 and part of 1899. I assisted in preparing the form for the first field books to be used by the water commissioners. We hoped that the result would be to encourage greater fidelity and accuracy on the part of the water commissioners. Something of that sort was needed. It is possibly true that the statements of water commissioners about various matters relating to things which they report upon are not noted for accuracy.

It is difficult to estimate the fair average duty of water, measured at ditch headgates, in District 8 and 2. I might say that approximately three acre feet per acre per annum would be such average duty for both of these districts.

In the month of Jan., 1912, I testified as a witness for the City in the case of the New York Trust Company against the City and County of Denver, in which the Water Company was cross complainant. In that case I testified under oath, in substance (exact quotation in original transcript), that one acre foot of water would

738 in this locality irrigate about half an acre of land quite well, three quarters of an acre fairly, and an acre rather poorly.

That represented my views as to the duty of water delivered at the land, and I think I had in mind new lands, that is, lands not hitherto irrigated. Such new lands require more water per acre. The meaning of my statement in that testimony was that one and one-third acre feet per acre per annum would be a sufficient supply to irrigate fairly, where delivered at the land.

I have testified here that as an average for Districts 8 and 2 three acre feet per acre per annum is necessary, delivered at the headgate. I estimate a loss between the headgate and the land of something like 35 or 40 per cent on the average, therefore my estimate according to my present testimony means about two acre feet per acre, delivered upon the land.

On direct examination in the present case I have testified in respect to Lake Marston that the duty of water from the reservoir would be two acre feet per acre per annum, delivered at the reservoir. Under that statement, the duty of the water at the land is to be ascertained by deducting all losses intervening between the reservoir and the land. I made that statement because if the irrigator has to pay the price which would be charged for the water from the reservoir, he is going to see that the loss is small. I admit that it is the duty of every irrigator, whether he takes his water from a reservoir or directly from the flow of the stream, to use the same care to make the water perform just as efficiently in either case in order that others whose appropriations are junior to his may get what they are entitled to from the stream. Nevertheless, I do not think that in determining the question of demand on the canon to be supplied before Cheesman can store, we ought to measure that demand, not

by actual diversions made by the ditches without regard to whether they actually need it or not, but according to the quantity which such ditches ought to take and apply to a beneficial use in an efficient and economical way. I think we should be governed by practical conditions as we find them. I am undertaking to say that the law will permit these ditches to divert more than they really need for the purpose of irrigating the lands under them. That is my judgment of the law of administration. The decree, which specifies the rate of flow, does entitle the ditch to take the water up to the quantity of the decree, so far as it be used for beneficial purposes, and the question as to whether the use is beneficial or not hinges largely upon the judgment of the user himself. I regard the judgment of the user as practically the controlling factor upon the question as to whether the water is being used beneficially or not. That is my conclusion as to what the law sanctions, under the laws and the decrees.

739 Assuming, as I did in my direct testimony, a duty of Lake Marston water of two acre feet per acre per annum, measured at the outlet of the reservoir, then in determining the duty of that water at the land all losses in transit would have to be deducted. Such loss amounts in general on the average to about one-third.

In my direct testimony in this case, speaking of the yield of the Bear Creek rights and their value, I stated in substance that the water could be utilized practically upon the basis of about 1¾ acre feet per acre. That represents the duty of the water as measured at the reservoir.

In my direct testimony in this case I stated in substance, in respect to Lake Cheesman and the water stored therein, that approximately two acre feet per acre of water, at the outlet of the reservoir, would be required for the irrigation of any lands likely to purchase that water under any of the existing ditches near or below the city of Denver. That was upon the assumption that the water would be purchased for the higher lands in Districts 8 and 2, instead of for the valley lands. Such as the lands under the Highline ditch. Such water would have to be conveyed in the South Platte river from Cheesman to the intake of the Highline ditch, then about 40 or 50 miles, or perhaps more, through the Highline ditch. No one can say what the loss in the river would be. My impression is that it would be less than five per cent—three to five per cent. The loss in the Highline for an average distance of 50 miles would be from 25 to 30 per cent, making a total loss of approximately 33 1/3 per cent. So that out of that two acre feet, as measured at Cheesman reservoir, we would get to the land approximately 1 1/3 acre feet. That would irrigate the lands fairly well.

In my estimates I have dealt with Cheesman lake and the other reservoirs of the company as a direct irrigation ditch would be dealt with—that is, as the sole source of supply, as distinguished from a merely supplemental supply. As to the waters to be stored in Lake Marston, I assumed that a portion of these would be diverted on lands in the Henrylyn district. The total loss on these between the reservoir and the lands would be perhaps 40%. There would remain out of the two acre feet per acre which left the reservoir very

little over one acre foot per acre. I assumed that these lands would have some other supply. My impression is that the Henrylyn would be very glad to get new water.

The duty of water must take into consideration the precipitation falling upon the land. Such a minute element as dew fall enters into the matter.

740 Exhibit 44, page 8, tables 9 and 10—diversions of ditches in District 8; and pages 9 and 10, tables 11 and 12—diversions of ditches in District 2: these tables were collected and tabulated by my assistants. I do not know of my own knowledge whether these figures as reported by the water commissioners were the result of actual measurements or mere estimates. I think my assistants took most of the figures from the field books of the water commissioners. I have made no comparison of these figures with the original sources of information, and do not know of my own personal knowledge whether my assistants have correctly set them down. I accepted these reports of the water commissioners as measuring the needs of the ditches without any regard to what duty of water these diversions showed, also without regard to my own opinion as to what would be the proper duty of water under the circumstances, and, in fact, without any consideration of that feature of the matter.

Take for illustration Exhibit 44, page 8, table 9—Nevada ditch: the table shows that during all of May the ditch was diverting each day at an average rate of 46.1 second feet, and that during all of November it was diverting each day at the rate of 7.3 second feet, continuous diversion, and that for the months June to October inclusive it diverted constantly at a rate of 55 second feet. Table 10 shows that the ditch diverted constantly from May 6th to November 4th at the rate of 55 second feet, which in table 8 is given as the rate on the maximum day. I think it is possible that in 1913 the Nevada ditch diverted at the rate of 55 second feet continuously for 183 days. I should say this was probably a very extravagant use of water if it was all put upon the land; so extravagant upon the face of it that I think I should call it a wasteful use. That diversion means about 2 acre feet per acre per month of the irrigation season for the acres under the ditch, or a total for the 183 days of approximately 20,000 acre feet. That means a duty for the acres under the ditch of over 12 acre feet per acre. That was an extravagant and wasteful use if that amount of water was applied to the lands. Nevertheless, I think the Nevada ditch under its decreed priority has the right, as against the claim of Lake Cheesman, to take such quantities of water as that from the stream. It is upon that assumption as to what the law is that I have prepared these exhibits and given my testimony in this case respecting possible storage at Lake Cheesman. The amount diverted by the Nevada ditch in 1913 was more than twice as much as its diversion in 1912, and greatly exceeds the quantity diverted by that ditch in any other year of its history, since 1889. It is about twice as much as the average quantity

741 of water diverted annually during the full period from 1889 to date. There has been no marked variation in the acreage under the ditch since 1909. As shown by Comstock's Exhibit A-52,

table 3, the duty of water under that ditch has been as follows: 1909, 4.94 acre feet per acre; 1910, 6.29 acre feet per acre; 1911, 7.85 acre feet per acre; 1912, 4.68 acre feet per acre; 1913, 12.30 acre feet per acre. Still I do not think there is anything the matter with the data which I obtained respecting that ditch for the year 1913. I see no reason to conclude that the ditch did not really divert such a quantity of water in that year. I think it remarkable that there should have been so much more diverted by the ditch in 1913, but still, so far as the figures themselves go, I see no reason to doubt their accuracy. I nevertheless propose to allow that quantity of water as a standard allowance against Lake Cheesman for the Nevada ditch before Lake Cheesman can store, and, all things considered, believe it justifiable. The average annual diversion of the Nevada ditch for the four years preceding 1913 was 5.8 acre feet per acre per annum. By taking the reported diversion for 1913 instead of that average I have increased the charge against Lake Cheesman, which must be filled in each and every year before Cheesman can store, by the amount of 10,000 acre feet annually. Nevertheless, takin all things into consideration, I think the assumption that the use in 1913 would constitute a fair measure of demand for the future is a fair one.

Exhibit 44, page 8, table 9—Last Chance ditch; shows diversions for June and September at the rate of 28 second feet, and at less rates for all of the other months, with the statement that the maximum daily rate was 28 second feet. Table 10, however, shows an average rate for 155 days of 28 second feet, and that diversion began on May 7th and ended on October 20th. Table 10 appears to be inconsistent with table 9; I cannot tell why. I understand it to be a copy from the report of the water commissioner. Tables 9 and 10 are inconsistent. I could not at this time say which is correct. According to table 10, the Last Chance ditch diverted in 155 days, 8,680 acre feet, a duty of 7.8 acre feet per acre for that year. According to table 9, the total diversion was 8,381 acre feet, and the duty 7.62 acre feet per acre. According to Exhibit A-52, table 7, the diversion of the Last Chance ditch in 1912 was 7,254 acre feet, making a duty of 6.51 acre feet per acre. 1912 was a year of full flow. Presumably they utilized all of the water they needed in that year. But in 1912, on account of rains in the summer, there was a very marked falling off of use of water in a great many of the ditches. It was not by any means a year of normal demand in some
742 months. The amount taken into ditches in 1912 was less than the normal for the years both before and since.

I do not think I disagree with my partner, Mr. Field, as to the year 1912. It is true that in 1912, although it was a year of large flow, Mr. Field did not permit Cheesman to store to its full capacity, as appears in his Exhibit 30. I did. The basis used by Mr. Field and that used by me are not the same. I say that these ditches diverted less than the normal in 1912. I do not think that he went into it quite so far as I did.

As to the Last Chance ditch; if the records show that in 1909 the ditch diverted 4,167 acre feet, with a duty of 4¾ acre feet per acre; that in 1910 the quantity diverted was 4,771 acre feet, with a duty

of 4.70 acre feet per acre; that in 1911 the quantity diverted was 5,076 acre feet, with a duty of 4.77 acre feet per acre; that in 1912 the quantity diverted was 7,254 acre feet, with a duty of 6.51 acre feet per acre; that for those four years the average quantity diverted annually was 5,317 acre feet, with an average of 5.1 acre feet per acre; and that in those four years the average acreage irrigated was 1,039, as compared with 1,100 in 1913; and that in 1913 the ditch diverted 8,680 acre feet, as compared with the average of 5,317, making a duty of the water of 7.9 acre feet per acre, as compared with the average of 5.1 acre feet per acre; I would think from the appearance of that that in 1913 the ditch probably diverted more water than they actually needed or required for crops that year. As compared with the average, that excessive diversion in 1913 was approximately 3,000 acre feet.

Taking only the Nevada and Last Chance ditches, in District No. 8, it appears that the excessive quantity diverted in 1913 by the Nevada was 11,000 acre feet, and by the Last Chance 3,000 acre feet, a total of excess diversions for those two ditches alone of 14,000 acre feet in 1913. This I have used as a constant quantity, charging it up year by year for all this series of years against Lake Cheesman, prior to any storage in Cheesman. That was an error, unless there were features that more than balanced it. Unless some features existed which balance and offset said error, then the opportunity of Cheesman to store for each of these years which I have considered ought to be increased on the average for each year about 14,000 acre feet.

Exhibit 44, page 8, table 9—Highline ditch: The information tabulated in tables 9 and 10 came from the water commissioners' reports. I did not myself look at all of the water commissioners' reports in respect to the Highline. If the water commissioner's annual report states that the Highline made a diversion at an average rate of 193 second feet for a period of 116 days, which would produce
743 a total of 44,742 acre feet, instead of 62,664 acre feet as my tables 9 and 10 show, then there is a serious error in my estimate in charging up such a quantity of water as that to Lake Cheesman, to be allowed each year on account of the Highline ditch before storage is permitted in Cheesman.

In 1913 the Highline and the Antero reservoir were being operated together. On that account more acres were broken for cultivation in that year than the average acreage. I heard Mr. Bull's statement that on the average the acreage irrigation from the Highline was approximately 20,000. According to my Exhibit 44, page 8, table 10, the acres irrigated in 1913 were 28,000.

I do not think it was proper to include in the diversions of the Highline, and to charge against Lake Cheesman before storage could occur, the quantities which in 1913 came down from the Antero reservoir and were diverted into the Highline to irrigate the additional acreage. I have seen a statement showing the quantity of storage water sent down from Antero and diverted into the Highline in 1913, but I did not examine it with respect to the tabulation in Exhibit 44, page 8. Nevertheless. I assumed that the quantity diverted

by the Highline in 1913, including said storage water, was a fair measure as to what the ditch would in future divert. It is true that storage waters from Antero reservoir diverted by the Highline in 1913 are not to be charged against Cheesman's right to store. If I have done so in this particular instance, that constitutes an error in my determination, unless other considerations exist to offset it.

I did not examine the annual report of the water commissioner for the purpose of finding out the facts concerning diversions through the Highline in the year 1913. If that report showed that for a period of forty days the ditch was diverting storage water, presumably from Antero, in a total quantity of 21,920 acre feet; and if the reasonable demands and needs of the ditch are to be measured by its diversions from direct flow in the year 1913, then the quantity of storage waters so diverted ought not to be charged up as a demand to be filled before Cheesman can store.

The field books of the water commissioner are expected to show his actions from day to day, including the facts relative to the diversion of ditches. I looked over the field book of the water commissioner in District 8 for the year 1913. I do not remember whether I found in that field book any statement as to the rate at which water was being diverted at any particular time in that season by either the Nevada or the Last Chance. Nor do I remember whether the only mention made of the Nevada or the Last Chance, as to their
744 respective rates of diversion, appears at the conclusion of the season, when a statement is made as to their average diversions, of 55 and 28 second feet, respectively, during the season.

Exhibit 44, page 8, table 9—Nevada ditch: Although it did not begin to operate until May 6th, the average rate of 55 second feet is in the table apportioned over all the days in May. The same thing is done in November. A similar process occurred as to the Last Chance. By that process, in the case of the Nevada ditch, I prohibited Cheesman from storing in the first five days of May and in the last twenty-six days of November because of the demands of the Nevada ditch, when as a matter of fact no such demands existed. The fact that the Nevada ditch diverted water at the rate of 55 second feet in the first four days of November does not indicate that it desired or needed to divert at the rate of seven and a fraction second feet for all of the following 26 days. Nevertheless, I do not think that the method which I adopted would, on the average, throughout a long period of years, make any difference in the result as to storage in Lake Cheesman.

The way in which the diversions of the Nevada and Last Chance ditches were reported in the field book of the water commissioner in 1913 indicated that the commissioner did not visit them during the season, or that he did not know the amounts of water that they were actually diverting from time to time, so as to include them in his weekly and monthly reports, or that at the end of the season he simply made the statement which he did because he knew that throughout the year they had received all of the water they wanted, or that he knew that they were carrying approximately their decreed capacity throughout the season. I do not know who the water com-

missioner of District No. 8 for the year 1913 was. I do not follow those matters very closely since I severed my connection with the State Engineer's office. I did not know that said water commissioner in that year was a new man, who had had no previous experience, and that his appointment occurred rather late in the irrigation season, his first report being for the week ending May 10th, although these facts are obvious from a consideration of his weekly reports. Nevertheless, I simply took the reports as to the use of water as the basis of my determination. If the facts stated above are correct, the probability is that a man of that sort had little knowledge and little experience in the measurement of water. Knowledge and experience are required for that purpose, and also required to estimate with any degree of accuracy the inflow of water. In that particular year, the first year of his experience, such a man would be likely to make mistakes in his estimates of flow or in his measurements of diversion by the ditches. He would be likely to
745 make mistakes in his estimates of inflow from tributaries and seepage. Considering the way in which the water commissioner reported the diversions of the Nevada ditch and the Last Chance ditch at the end of the season only, it would be the natural inference that he had failed to visit those ditches during the season, or had been unable to estimate or measure the flow into the same, and had made a sort of an estimate of an average at the end of the season. Such estimates are likely to be in error.

I did not know what devices the Nevada ditch was supplied with for wasting back into the stream the water diverted at the headgate, and did not know that it was the custom of that ditch to maintain a constant head and to waste the water back in-o the stream at these various discharge points. I think it likely, however, as that is the ambition of almost every ditch. Thereby they get the water back into the river in time to meet the needs of the next diverter below. But the water so diverted by the Nevada ditch and afterwards wasted back into the river would be included in the water commissioner's report of diversion by that ditch.

I believe the Last Chance ditch is similarly provided with waste ways, and I think it likely that they operated in a similar way—that is, they take in the full capacity at the headgate and waste it into the river in time to meet the needs of the next diverter below. That would be counted as a diversion for the first ditch which takes it out, and also counted as a diversion by the ditch which again diverts it below. It does appear in the water commissioner's reports of diversion, which I have made use of. I have not considered the duty of water which these respective diversions of ditches in District 8 for 1913 would show. It is true that that duty would be as follows: Platte Water Company, or City ditch, 7.64 acre feet per acre; Nevada ditch, 12.30 acre feet per acre; Petersburg, 6.72 acre feet per acre; Platte Valley, 8.45 acre feet per acre; Brown, 8.05 acre feet per acre; Last Chance, 7.89 acre feet per acre; Green Valley, 13.20 acre feet per acre; Northern Colorado Irrigation Company (Highline), 2.24 acre feet per acre. All of those duties are very much lower—that is, amount to an application of a very much greater

quantity of water per acre, than any testimony which I have given as a proper application, either in this case or in the New York Trust Company case, with the single exception of the Highline. The Highline, however, covers most of the land.

Exhibit 44, pages 9 and 10, tables 11 and 12—diversions by ditches in District No. 2: As in District 8, some of the ditches in 2 are provided with appliances for wasting the water back into the river, and are operated by diverting a steady flow at the
746 headgate and wasting it back into the river for the use of the next consumer below. As a result of that, there is a doubling up of quantity of water actually used to irrigate crops, in that the diversion of the same water is counted twice. Nevertheless, I have used the figures of diversion as reported by the commissioner.

The decree of the Jay Thomas ditch has been reduced from 104.35 second feet, as stated in table 11, page 9, Exhibit 44, to 18 second feet. Under that ditch, according to my exhibit, the duty of water in 1913 was 13.6 acre feet per acre. I do not think there are any garden tracts under the Jay Thomas ditch.

Exhibit 44, page 10, table 12—the Burlington ditch: The diversions shown would produce 85,652 acre feet, making a duty of water under that ditch of 5.73 acre feet per acre. I do not know how much of that water was diverted by the Burlington under its direct flow rights, and how much for purposes of storage. Its only storage decree prior to Cheesman is for Barr Lake, amounting in total quantity to 11,000 acre feet, with some addition for loss by seepage. The addition for loss by seepage would bring the total for Barr Lake up to approximately 16,500 acre feet. The water commissioner is presumed to report what quantity is diverted by each ditch for storage purposes. The figures appearing opposite the Burlington in table 11, Exhibit 44, for the months of January, February, March, April, November, December, and part of October are quantities which the water commissioner reported as having been diverted for storage.

In District No. 2 diversions for storage are made both for decreed and undecreed reservoirs which are subsequent in time to Cheesman. According to my table, the diversions made by the Burlington in January and March would yield 11,916 acre feet, which is more than is necessary to fill Barr Lake's priority. The diversion made in April would furnish 13,500 acre feet, which could not have been on the original priority of Barr Lake. I think it was important to determine whether these diversions were made for storage or for direct irrigation, but I did not make that determination. If in fact the Burlington's diversion in April was for storage purposes, it must have been upon an appropriation junior to Cheesman. The note at the foot of table 11, page 9, Exhibit 44, could not have referred to other ditches having prior appropriations for storage purposes, because there are none such. The persons who compiled this information for me stated that the amount diverted for storage purposes could not be segregated from that diverted for direct flow rights. If the water commissioners' reports show otherwise, that was a mistake.

747 Exhibit 44, page 9, table 11: The diversions by the Burlington in October, 1913, would yield 17,573 acre feet, which was presumably for storage, and the large drafts made in November and December were likewise for storage purposes. Those must have been upon an appropriation junior to Cheesman, unless they were placing the same in Barr Lake for the next year. Even if they were doing that, they would have filled Barr Lake in October, and diverted 6,583 acre feet in addition. The 17,000 acre feet, approximately, diverted in October alone, if wrongfully charged against Lake Cheesman, would entirely eliminate the canal demand upon the canon for the month of October, as stated in table 14, page 12, last column, month of October.

Without calling specific attention to the various canals in Districts 2 and 8, the matters so far brought to my attention are such that I do not believe I could, without giving the question further consideration, say whether or not we are likely to arrive at just results by taking as the absolute measure of the real needs of these ditches the diversions made in the one year, 1913, as reported by the water commissioners and as incorporated in these tables. The matters already suggested certainly have an important bearing upon that question. But they are not enough as yet to make me think that the assumption is not a fair assumption. That is because I have in mind some compensating features which must offset any overestimates of demand or other errors which may occur in respect to this method of arriving at the real demand. Those compensating features are as follows: (1) the Lupton Short Line ditch, with a decree intervening between the two decrees of Lake Cheesman; (2) the changes in the decree of the Fort Morgan Land and Reservoir Company's canal; (3) the distance from Lake Cheesman to the points where the demands arise; (4) the flattening out of the peak floods, and the seepage of water in the bottom lands and valley lands; (5) the fact, discussed yesterday, that recorded flows at the canon exceed the actual flows to some extent, which fact had a little weight with me; (6) the surprisingly small demand of the Burlington ditch in the summer months of 1913; (7) the small amount of diversion in April; (8) the fact that the actual capacity of Lake Cheesman is less than that reported, on account of its filling to some extent with silt.

The decree of the Lupton Short Line is of July 6, 1892, for 72 second feet; its actual capacity to divert is something like 25 or 30 second feet, according to my recollection. But I have a memorandum here that its capacity is 70 second feet. I have already re-

748 ferred to the Lupton Short Line as offsetting my failure to permit Cheesman to store on the peak floods. I have not made any exact computation to determine whether the plusses and minuses in my estimates offset one another.

The canal of the Fort Morgan Land and Reservoir Company is in District No. 1. Its decree was recently increased by about 300 second feet, as of date 1888. It is impossible to say to what extent a demand of that sort down at Fort Morgan would be reflected on the right to store at Cheesman. It would have an important bearing.

In my computation I made the assumption that so far as District No. 2 was concerned, the demands of District No. 1 would be satisfied by the inflow of certain tributaries. I think that assumption rather more favorable to Lake Cheesman than was actually warranted by the records; how much more favorable I do not know. I am unable to say that the errors I have made against Lake Cheesman are offset by the errors I have made in its favor. No engineer who is experienced in these things assumes that his figures are absolutely correct.

As to the distance of the ditches from Lake Cheesman and the flattening out of the floods, I have already used that as a factor offsetting my failure to permit Cheesman to store on the peak floods.

As to the possibility that the measurements of the flow at Platte Canon may have exceeded the actual flow, because of the rocky and boulder filled bed of the stream, I do not know the extent of such excess, if any, and I do not know what measurements of that sort are justly subject to that criticism. Moreover, I have already used that as a factor to offset my failure to permit Lake Cheesman to store the peak floods.

As to the small diversions of the Burlington during the irrigation season of 1913; for the purpose of my computation I assumed with respect to all of the ditches that their diversions in 1913 represented what they on the average really needed. I have no figures on the diversions of the Burlington ditch during the last several years. They usually fill Barr Lake, and make some diversions in addition to that for direct irrigation. I did not know that for the last four or five years the quantity of the average annual diversion of the Burlington, including the filling of Barr Lake, has been about 20,000 acre feet. I did not know that in the year 1913, including the filling of Barr Lake, the quantity diverted for direct irrigation was approximately 22,000 acre feet. Those figures would not show that there was any less diverted for direct irrigation in 1913 than had been drawn on the average in previous years. I could not say how many of the acres under that ditch are put into cultivation in reliance upon water to be diverted under priorities later than
749 Cheesman. I had no other information upon which to base my statement that in 1913 the Burlington drew less than it usually needed.

As to my statement that the diversions of the ditches in April 1913 were less than they usually are: the Highline usually draws in April; the records of a number of years show that less than five per cent of the water drawn in District No. 2 in each year was drawn in the month of April. I have made no investigation or examination to determine how much, if at all, the draft in April, 1913 was less than the usual quantity diverted in that month in other years.

As to my statement that the capacity of Lake Cheesman as recorded has been decreased by reason of silting: No one can say to what extent. I think it has been at least—others said from two to three hundred acre feet; I do not know. There is some capacity in Lake

Cheesman below the outlet, not included in its rated capacity. This is about 75 or 100 acre feet.

Even though the rated capacity of Lake Cheesman has been decreased 300 acre feet by reason of silting, it would not affect my estimate of the storable quantities on the various assumed drafts, except when the reservoir was standing full. Still the shortage in real capacity of the lake produced by silting, even to the extent of 300 acre feet as stated by me, would have an effect upon possible storages. I do not think that effect would be so small as to be negligible.

Exhibit 44, pages 9 and 10, tables 11 and 12—diversions of ditches in District 2: I do not know whether the Union ditch is the intake for the Lower Latham reservoir, but would have thought that it was. According to the figures given in table 12, the diversion of the Union ditch 1913 resulted in a duty of more than 5 acre feet per acre. On the basis of those figures, that is a low duty. If the Lower Latham reservoir was filled in that year, I cannot be sure that this quantity includes water diverted for the reservoir. I did not look into that point in making this estimate. That duty of water indicates an unusual and unnecessarily large diversion for the number of acres under the ditch, for direct irrigation. The appropriation of the Lower Latham reservoir is junior to Cheesman. The notes prepared by my assistants do not indicate whether the diversions made by the Union ditch, or any part thereof, were or were not for storage. I have not myself examined into that particular point.

Exhibit 44, page 10, table 12—Evans No. 2 ditch; that ditch is the conduit which conveys water from the river to Milton lake. In 1913 some water was diverted for storage in Milton lake; I do not know how much; I have not specially investigated that question in connection with getting up this table. I do not know
750 how much of the water diverted by the Evans No. 2 ditch in 1913 was diverted for storage in Milton lake. The storage right of Milton lake is subsequent to that of Cheesman.

If as a matter of fact a part of that water was diverted through the Union ditch for storage in Lower Latham reservoir, and through the Evans No. 2 ditch for storage in Milton lake, such diversions, being on rights junior to Cheesman, ought not to be charged up against Lake Cheesman storage. That would be true if you were trying to reduce the matter to the utmost detail. In arriving at average conclusions I think it ought to be so charged, taking into consideration the fact that the duty of that entire district appears to have been less than 3 acre feet per acre.

It appears that I have not taken as the measure of the needs of the ditches the quantities diverted for direct irrigation, but have taken such quantities plus considerable quantities diverted for storage on later priorities than Cheesman. I call 17,000 acre feet, so included in the month of October in the case of the Burlington ditch, a relatively small amount.

Referring to the note at the foot of table 12: Section No. 3 ditch has no connection whatever with the Burlington.

There is some confusion in the commissioners' reports. I cannot explain this any more than I did before.

As to the Nevada ditch, in District 8, the water commissioner's field book for 1913 gives May 7th as the first day on which water was diverted, and his annual report gives May 17th as such date. My tables disclose a number of inconsistencies and inaccuracies in the water commissioners' reports. Nevertheless, I do not think that the water commissioners' reports are conspicuous for the erroneous and loose statements which they contain.

As to the amended decree of th Fort Morgan ditch, referred to as a compensating feature to set off against mistakes made against Lake Cheesman: I have not visited that ditch for ten or twelve years. The intake is about 20 miles below Kersey, probably 24 or 25 miles below the lower boundary line of District No. 2. It is some distance down into district No. 1. It is on the East and South side of the river. I have not the details of that decree, and do not know whether the additional quantity decreed is for direct irrigation purposes or for storage. If it be for direct irrigation purposes, manifestly there must have been a diversion of that sort going on by that canal for some considerable period of time. As the decree relates back to 1888, the use of water must relate back to the same date; otherwise they could not have obtained such a decree,
751 unless they had very skillful lawyers. They could not do it unless the lawyers succeeded in fooling the court.

As to deduction from total diversion to arrive at demand upon the canon: After having arrived at the total of the diversions in Districts 8 and 2, I first deducted all of the estimated inflow from tributaries and seepage in District No. 8, as shown by Exhibit 44, page 6, table 7. That table is made up from the weekly reports of the water commissioner, except quantities marked by stars, which are estimated by me. We should also put a star after the quantity of inflow from Bear Creek in April, also Cherry Creek, and seepage for April; likewise, January, February, March and December. Out of the 48 entries appearing in said table 7, 20 have been estimated by me. Those estimates were based on a few known flows, and by comparisons with the rest of the table. As they do not enter into the conclusions any way, reasonable amounts were set down to fill out the table. Those estimates were made by my assistants and referred to me for final approval. No measurements were made. So far as I know, the commissioners have never reported upon the stream flows of any of these tributaries in District 8 for the months January, February, March, April and December in any year. Even the figures for tributary inflow reported by the water commissioners in Districts 2 and 8 are mere estimates and not measurements.

As between Cherry Creek inflow and seepage, I do not know how much is attributable to each. It is my understanding that the water commissioner reports them together. Cherry Creek has an extremely variable flow. It is subject to floods. There are floods in almost every season, sometimes very heavy and destructive.

It is true that there are so many stars on this table 7 that it looks

like a considerable constellation. All of the figures are estimates, estimated either by my assistants or by the water commissioners.

In addition to deducting seepage and tributary inflow in District 8, I also deducted from the gross diversions of the ditches the seepage in District No. 2 and the inflow from Clear Creek, both as estimated by the water commissioner. I left out of consideration all other accretions to the stream in District No. 2.

As to district No. 2, these matters are tabulated in Exhibit 44, page 5, table 6, and page 7, table 8. The figures are taken from the weekly reports of the water commissioner. The figures are the result of his estimates, and not of measurements. As here used, seepage covers sewage from Denver. That also is an estimate by the water commissioner. Sewage varies from year to year, as the use of water varies in the city of Denver. Less water was
752 used in Denver in 1913 than in 1910, nevertheless, I am inclined to think 1913 measures what will be the average use in future years. As the town grows the use will be increased, unless the meter system is installed. If present practices continue, the use will increase, and the sewage will increase accordingly. Nevertheless I think it fair to take the actual quantity of sewage in 1913 as the measure for the future, because we make no allowance for the use of additional amounts of water under existing decrees. That is an additional factor which I have in mind as an offset against any injustice I may have done to Lake Cheesman in these estimates. Cheesman have a right to greatly and materially extend the acreage I have no doubt that these old ditches having priorities earlier than which they have during this long period of years been serving, and so increase their diversions for the purpose of serving these new lands, as against the right of Cheesman and other subsequent appropriators. I had this in mind as an offset to any possible injustice I might do to Cheesman by my method of determination.

As to accretions in District No. 2, I have allowed all tributary inflow except Ralston and Clear Creeks to go to District No. 1. There are a large number of tributaries in District No. 2 aside from Clear Creek, but most of them return little but seepage. My assumption was that on the average these tributaries other than Clear Creek would furnish enough water to supply District No. 1.

Exhibit 44, page 5, table 6, deals with the St. Vrain and the Big Thompson only. The table was prepared to show that the amounts reported as inflow from those two streams approximates in amount the quantity reported as outflow from District No. 2 to District No. 1. The table is simply illustrative. I do not necessarily derive from it the conclusion that all of the inflow from the St. Vrain and the Big Thompson is needed all of the time to supply the ditches in District No. 1, nor that the ditches in District No. 2 are not entitled to take it at all. Nevertheless, I have made the assumption that on the average that would be the condition. Said table No. 6 covers figures for these inflows as reported in the weekly reports of the water commissioner—they are estimates. Said table covers only the period May 10th to September 20th, although my tables in respect to other tributaries covered the entire calendar year. I

cannot say positively why that is. Apparently the water commissioner in District 2 reports these inflows for the entire calendar year. Table 6 might have been extended to cover the irrigation season.

753 Both in May, and also in September and October, as appears from table 14, Exhibit 44, I have charged up large deficiencies in respect to the demand of ditches not supplied by seepage and inflow, but which must be supplied from the canon, nevertheless I did not think it was necessary to consider the inflow from the St. Vrain and the Big Thompson during those months, although that inflow might have been large. But if, for example, in the month of October the demand in District No. 1 was entirely supplied from sources other than these two tributaries, then the demand of District No. 2 ought to be lessened by the accretions from the St. Vrain and the Big Thompson. But I would like to look into that matter a little further. I do not think it is obvious. If the accretions from the St. Vrain and the Big Thompson in October amounted to 11,000 acre feet, this added to the 16,900 acre feet diverted by the Burlington in October for storage, under a priority junior to Cheesman, would practically balance the demand on the canon for irrigation diversions in the month of October, as shown by Exhibit 44, page 12, table 14.

The streams in this region are extremely varying in their flow. Not only does each stream vary from year to year, but they vary from year to year in their relations to one another in respect to stream flow. The tributaries which enter Districts 8 and 2 have their headwaters along the mountain range, through a wide region, extending from the South Park up to the Wyoming line. The condition at the headwaters of these various tributaries, as to snow, rain, temperature, etc., have a great deal to do with the condition of the stream flow. These conditions vary greatly in the different water sheds of these different streams. Nevertheless, I took absolute conditions as they existed in the year 1913 for building up the absolute quantity to be each year charged against Lake Cheesman. I determined from all the data that I had at hand that that year would fairly represent average conditions.

It is true that in the case of the New York Trust Company vs. the City and County of Denver I testified in substance as follows (exact quotation in original transcript): that for the purpose of determining the amount of water available I did not consider it fair to take the mean flow of the stream for one year, or for a period of ten years, but that all the figures possible ought to be used in arriving at an estimate of the mean flow; also that when I was called upon to report upon irrigation projects and the amount of water available, I did not use the mean flow of the stream for a period of ten years or for one year, but that I ascertained the variations from one month to another, and did not confine myself to a period

754 of ten years. The streams I was there speaking of were these streams tributary to the Platte, and the reason for my testimony was the varying character of their flow. Nevertheless, in this case I have taken the record of one single year as the absolute guide

for all years. In this case I did not have before me any tabulations, nor did I examine any records, respecting the stream flows in these various tributary streams for any period of years prior to 1913.

I also testified in the New York Trust Company case (exact quotation in original transcript) that the flow of water in the South Platte varies greatly in quantity, not only month by month but day by day; in that regard conditions are the same in the tributaries. But in this case I did not use the stream flows of the South Platte and of the south fork of the South Platte as they existed in the year 1913 only in determining possible storages at Lake Cheesman. I had definite data on that subject covering a long period of years. We have no such record as to the tributaries. If we had had such data as to the tributaries, I think it should have been used in obtaining the average; nevertheless, I think I obtained fair results by using the tributary stream flows of 1913 only.

Exhibit 44, page 12, table 14, last column to the right shows demand on the canon as determined by me. I have not compared those figures with the analogous conclusion reached by Mr. Field.

Exhibit 44, page 3, table 4: Prior to looking at that table I had been under the impression that the year 1902 was the year of lowest flow in that series of years. It is generally so understood by engineers and others familiar with stream flows in this locality. A large number of quantities in this table are either built up or expanded by me from the record of a few days in the month, or else they are arrived at by me by ratio and proportion, on the theory of a supposed relation between the flow in the south fork and the flow in the main river. The expanding method is applied mostly in the winter months of January, February, March, November and December. I think stream flows in those months are more uniform than in the other months of the year. (His result for April, 1905 by the expension method compared with actual stream flows as shown in Exhibit A-27.) Manifestly there is an erroneous statement in my table as to that month.

In table 4, the figures arrived at by the application of the ratio and proportion method are marked with a star. This ratio has been computed from the figures appearing in tables 2, 3, 4 and 5, using for that purpose only those figures in table 4 taken from actual records and not estimated by me.

755 Comparing tables 4 and 5, on pages 3 and 4, respectively, of Exhibit 44, it appears that there were only nine years during which we had actual records for both streams. It also appears that there were only seven years in which we had simultaneous records for the month of January. Table 3 on page 2 shows as result of my computation, a ratio of 24% for the flow of the south fork for the month of January. Comparing the actual flows, as recorded in tables 4 and 5, for the month of January, yields the following percentages: 1900, 25.35; 1904, 3.07; 1909, 28.06; 1910, 38; 1911, 17; 1912, 19.42; 1913, 16.44. That shows a very great variation in the relation between the flows of those two streams for that period of seven years during which we have actual records. Nevertheless I have used an average percentage for the purpose of

building up the stream flows for those years when we have not actual records at the South Platte. A similar variation exists in the other months of the several years where simultaneous records exist. Nevertheless, I have taken an average percentage for each of those and appli-d it in building up stream flows.

These facts illustrate the great variation which occurs from year to year in the relation of the flow of one stream to the flow of another, even though they both be tributaries of the same main stream, also the great variation in the actual flow of the same stream from one year to another.

In building up stream flow at South Platte for January, 1902, I have taken the average percentage of 24% as the flow of the south fork, which yields a total discharge of 15,900 acre feet. I think it is quite doubtful that there was any such discharge in the year 1902. I think it probable that by that method too much was allowed for the year 1902. I think it probably true that the total quantity shown as the discharge for the year 1902 on said table 4 is erroneous, in that it is too large. But the errors occurred in such months as would not affect storable quantities in Lake Cheesman. For example, January, 1902, as shown on table 4, gives a discharge at Platte canon about three times the average for that month; and December, 1902, presents a similar situation. It is probably quite out of the question, considering the fact that year 1902 was a very dry year, that these are correct figures, being greater than any recorded flow. Moreover, applying my percentage for December, as shown in table 3, and considering the recorded stream flow in the south fork, the arithmetical result ought to have been 2,610 acre feet, instead of 17,700 acre feet. I think that must be an error. Such thinks as those I think clearly account for the fact that in Exhibit 44, table 4, 1902 does not appear to be the lowest year in point of stream flow. In that table out of the total quantity
756 which I estimated as the discharge of 1902, about 40% is covered by these estimates of mine.

Exhibit 44, page 4, table 5—discharge of the south fork at Lake Cheesman: this is derived from the information furnished to the state engineer by the Water Company. It is the only data available, and is the data which has been used by all of the engineers who have testified in his case, including Mr. Field and myself. The stream flows are reported by the Water Company, which reports are kept on file in the State Engineer's office.

Exhibit 44, page 13, table 15, shows how the various factors of my determination are applied to each of the years 1900 to 1913, giving the total available storage at Lake Cheesman in each month of each of those years, according to my estimates. I have deducted from the discharge of the South Platte at Platte Canon not only the irrigation demands, but also the needs for the direct flow rights of The Denver Union Water Company, as measured by the diversions shown in table 13, page 11, Exhibit 44. I have assumed that all of those diversions by the Water Company were upon rights prior in point of time to Cheesman. The opportunity of Cheesman to store is, of course, finally limited by the quantities flowing in the

south fork. Those quantities ascertained by me are the quantities reported by the Water Company. If those quantities are less than the actual flow, then my results are incorrect.

I have prepared these tables upon the assumption that the recorded inflow into Lake Cheesman accurately represented the actual inflow as measured over weirs on the South Fork and on Goose creek. There are other sources of supply to Lake Cheesman; for instance, Turkey creek, other canons and gulches, and possibly springs in the bed of the reservoir. There are no means of measuring the inflow from these other sources.

If as a matter of fact the inflow into Lake Cheesman as reported is determined by changes in the level of the lake, shown by a gauge rod, then the reported and recorded inflows do not represent the actual inflows. Such recorded inflows would be less than the actual inflows to the extent that there had been any loss from the lake by reason of evaporation and other causes. According to my estimate of evaporation and other losses, that amounts in the aggregate to a vertical loss of approximately five feet per annum. That would amount to a good many acre feet in the course of a year, considering the stages at which the water has actually been standing in Lake Cheesman since the lake was constructed. It would be a matter of pretty intricate balancing and careful calculation to determine how much that would amount to. According to my estimate of
757 vertical loss from evaporation and other causes of approximately 5 feet per annum, that would mean, on a full reservoir, a difference in stream flow of between 43 and 44 hundred acre feet.

My method differed from that of Anderson and Comstock in that I permitted no storage of Cheesman unless the flow at Platte Canon was sufficient at all times to at least supply the estimated demands of the Water Company for its direct diversions, whereas Mr. Anderson and Mr. Comstock in the winter months permitted storage of all the waters flowing in the south fork, thereafter deducting from the estimated yield of the Platte Canon ditch whatever quantities it had been deprived of by that method. If I had followed their method, of course my estimate of quantities storable at Lake Cheesman would have been increased.

In table 15, all figures except those appearing under the columns relating to "Excess at Canon" and "Available Storage at Cheesman" are taken from the previous tables in Exhibit 44.

Exhibit 44, page 20, table 16, is merely a statement of the available storage in total quantity for each year of the series, as exhibited on table 15, except that in table 16 for years of full supply I have limited the total available storage by the capacity of the reservoir.

The year 1914 is a year of full supply, and Lake Cheesman would have been able to fill to its capacity. The year 1899 was also a year of large flow. I think it probable that Lake Cheesman could have been filled in that year. If 1899 and 1914 had been added to table 16 as years of full supply, of course the average would have been raised.

Exhibit 44, pages 22 et seq., dealing with averages for Lake Cheesman on assumed draft of 40,000 acre feet, and also on assumed

draft of 50,000 acre feet: In each of these tables I have dealt with Lake Cheesman as furnishing water in the months May to October, inclusive, in substantially the following percentages: May 16%, June 25%, July 25%, August 20%, September 10% October 5%. That is, the use of the reservoir as a means of sole supply. I have not upon either of the assumed drafts estimated, as Mr. Bull did, what quantity would be required to be wasted over the spillway. Under the 40,000 acre foot draft undoubtedly a considerable quantity otherwise storable would so escape. I have made no estimates of the quantity so wasted. I do not think it is material. In my judgment you could get more for the water per acre foot on the basis of a 40,000 acre foot draft than on the basis of a 50,000 acre foot draft. I think the difference in the price per acre foot would be about $7. I think that on the basis of a 40,000 acre foot draft, with an efficiency of 95.6 per cent (as shown in Exhibit 44,
758 page 36) the reservoir should be able to sell water rights at the rate of $35 an acre foot, whereas on a 50,000 acre foot draft, with an efficiency of 91%, it would be obliged to sell water rights at the rate of $28 per acre foot. I made no computation to determine what price could be obtained per acre foot on a basis of a 60,000 acre foot draft. The computation which I just now made to determine the difference in price between a 50,000 acre foot draft and a 40,000 acre foot draft was an arithmetical computation, whereby I determined at what price per acre foot you would have to sell 50,000 acre feet in order to yield exactly the same total as 40,000 acre feet would yield at the rate of $35 per acre foot.

The stages of the water in the reservoir upon the various assumptions of annual draft at times when there is storable water in the stream limit the capability of the reservoir to retain and store such water. It is therefore important to so operate the reservoir, and upon such an annual draft, that to as great an extent as possible there may be space in the reservoir in which to retain these waters available for storage when they come down the stream. The quantity of water wasted out of the appropriation on an assumed draft of 40,000 acre feet is an important consideration in determining whether or not the 40,000 acre foot draft is the proper draft. I am inclined to think that before finally determining how to operate the reservoir, the practice and experience of a good many years ought to be had, and that the operation should be based upon that experience.

In my tables of operation on the 40,000 and 50,000 acre foot draft I have begun on January 1, 1900 with a reservoir half full, although, as I have previously stated, the reservoir might have been completely filled in 1899. The stream flows in 1899 were such, as shown by my exhibits, that that year, if it had been added to the list, would have given a performance of 100 per cent efficiency either on the 40,000 or the 50,000 acre foot draft, and still there would have been enough water remaining to give 100 per cent efficiency on either draft in the year 1900. The year 1914 would also have shown 100 per cent efficiency, either on the 40,000 or the 50,000 acre foot draft. By adding 1899 and 1914 as years of full efficiency the percentage of efficiency on either draft would, of course, have been raised. But I

think it would have given an incorrect average, because we begin and end with a full year.

As to the matter of evaporation on these tabulations of operation under assumed drafts: For each month I took the mean of the surface areas at the beginning and at the end of the month, and to that mean applied the factor for that month, as shown on page 21 of Exhibit 44, table 17. To ascertain the factor of vertical loss
759 for each month, I have taken the average of Cheyenne, Colorado Springs, Denver and Pikes Peake. I assumed that there was enough difference between Pikes Peak and what exists at Lake Cheesman so that the inclusion of Pikes Peak in the stations from which an average was to be taken would give what the evaporation ought to be at Cheesman, in spite of the fact that the evaporation at all of the other stations was in my judgment greater than at Lake Cheesman. I think that is a very fair way to get at it. In that way I arrived at a vertical loss from evaporation alone of 57.9 inches annually, or in feet 4.832. To that I added other losses estimated for the year to be .268 of a foot, or about 3 inches; the loss from all other causes being estimated as approximately one-twentieth of the loss from evaporation.

I have made no deduction for precipitation. Exhibit 44, table 1A, is a diagram showing the amount of precipitation at Lake Cheesman. That shows an average annual precipitation at Cheesman at 16.30 inches. I do not think loss by evaporation from the surface of the lake ought to be offset by the quantity which falls on the surface as precipitation. If I deducted precipitation, the net loss from all causes would be approximately 45 inches, or 3 feet and 9 inches. I do not make that deduction, because I think the precipitation belongs to the river. If the reservoir were not there, I do not think that all of the water precipitated would enter the stream below. I do not think it is the duty of a reservoir owner to put a roof over his reservoir. I think it is practically impossible to require the owner of a reservoir whenever there is a rainfall to let out of his reservoir whatever has fallen on it. Nevertheless I think the precipitation belongs to the river, and not to the reservoir. If a man should start a farm by a riverside and irrigate from the rainfall to raise his crops, I do not think that other farmers who irrigate from the river to raise their crops would be entitled to an injunction against him. I think there is a difference in principle between the two things. There are laws for the purpose of regulating the storable amounts in reservoirs, while there is no such law and no practical way to cover such a condition as you suggest regarding farmers. I should have to look up the question as to what law I refer to relating to reservoirs which covers this question. I have never known any regulating power in this state to regulate a reservoir in respect to the precipitation which must fall upon its surface. But I think it is the general practice of engineers to treat the matter as I have treated it. It is my regular practice.

"Q. Do you know of any other engineer who follows that practice?"

(Objected to. Objection sustained. Exception.)

760 I cannot say that I know of any reservoir, either on the plains or in a stream bed, where in my practive I have treated the evaporation and precipitation in the way that I have treated them here. In some cases I have considered it immaterial. Wherever I have considered it material, I think I have dealt with it as I have here, but I cannot be positive as to that. I do not know of any case in the administration of the water laws of this state where a reservoir, either in a stream bed or apart from a stream bed, has been required to account to the stream for the precipitation.

If in my direct examination I referred to losses through the gates as being properly chargeable against the storage, I am not of the opinion that losses through the gates should not have been charged up against the reservoir.

The precipitation upon Lake Cheesman when the reservoir is full amounts to from 1,000 to 1,200 acre feet per annum.

I have concluded that the best draft to adopt for Lake Cheesman, under my assumption of available storage, is a draft of 40,000 acre feet, to which I apply a unit price of $35 per second foot, making a total value of Lake Cheesman as an entity of $1,400,000. On the other hand, if you should assume an annual draft of 50,000 acre feet, I would apply a price of $28 per acre foot, again making to total value $1,400,000. The factors entering into a determination of the value, or what the water is worth to a farmer for irrigation purposes; the stability of the water; the distance of the land that would be irrigated from the headgate of the canal; the length of time that it would probably take to dispose of this water; the overhead charges to the company—that is, the cost of administration until the sales were made, etc.; the cost of finding consumers, peddling out the water, etc.; perhaps other factors. Therefore the figure which I mention here is the figure which I have arrived at as the probable net amount of money realized by the reservoir out of the sale of each acre foot. It is not the price which the purchaser would pay. On the basis of a 40,000 acre foot draft, I think a purchaser would probably pay four or five dollars more per acre foot, that is about $40.

Out of the Standley Lake system, which is a new system and is a combination of direct flow and reservoir rights, they have been selling water at the rate of $50 per acre foot. I do not think the Standley Lake system, when its capacity is sold, will have any such efficiency as I have shown for Lake Cheesman on a 40,000 acre foot draft. I have given to Lake Cheesman lower prices because its water rights would not carry with them any interest in any distribution system. If I were estimating Lake Cheesman as a

761 means of furnishing a supplemental supply, instead of a sole supply, I would place different unit values upon the water rights, but it is my opinion that it would be practically impossible to find a market for all the Cheesman and Marston lake waters as supplemental supply, nor for the water of Lake Cheesman by itself, if we assume that all of these waters claimed by The Denver Union Water Company are to be turned to irrigation purposes. If a market existed for Lake Cheesman's water as a supplemental supply, I

would add to my unit price $5 per acre foot, making a total of $45. I am a bear on water right values. I do not agree even with Mr. Field upon that subject. I do not think there is a sufficient demand for supplemental supply in ditches now existing and not having an adequate supply to consume even as much as 40,000 acre feet per annum at $40 per acre foot.

In the New York Trust Company case, already quoted from, I testified in substance (exact quotation in original transcript) that the value of an acre foot of water varies, with the priority, etc., from $25 to $50, and that the value of an acre foot of water usually depends upon the source from which it is obtained; as, for example, an acre foot of water from Barr Lake would be worth considerably more than an acre foot from Standley lake or Milton lake. Standley lake and Milton lake are the lakes of the Denver Reservoir Irrigation Company, or Standley Lake System. Barr Lake is the lake having a priority of 11,000 acre feet, prior to that of Cheesman, located in District No. 2, and fed by the Burlington ditch. The reason for that statement is because of the greater reliability of the supply from Barr lake, and I think I must have had in mind the assumption that all the rights of each were to be sold.

I also testified in the New York Trust Company case in substance (exact quotation in original transcript) that the Standley Lake system was selling water at $50 an acre foot, although at that time they had not yet secured any water, although I believe they had some water in the resrvoir. I think the rights in Standley Lake and the system which goes with it are probably worth more than Cheesman Lake water.

When I said that water was worth from $25 to $50 per acre foot I undoubtedly took into consideration the sale price. My estimates of value in this case are based on practical application and what I think the farmer can afford to pay, and also what the practice is among farmers as to the purchase of water. I do not think $50 per acre foot is more than the farmer can afford to pay, if the right carries with it the right to convey the water to his lands. The sale of Cheesman water does not include any method of taking the water to the land. I think the cost of that would be $15 per
762 acre foot right. That cost depends altogether upon the distance from the intake of the ditch to the point where the lands are located. I have not investigated the charges made by existing ditches for conveying water. I have discounted the price which I would otherwise place upon Lake Cheesman water, used as a sole supply, because of the overhead cost and charges which would be involved in marketing the water, etc. I have not made exact estimates of those costs. I have known of cases under various systems where the cost of selling the water has run from $1 up to $10 per acre of land. On a duty of 2 acre feet per acre, that would mean from 50 cents to $5 per acre foot. In the case of Lake Cheesman I expect the cost would be somewhere in the neighborhood of $5 per acre foot.

There is a great cry and a great need for irrigation water in the vicinity of Denver. There are thousands of acres in the vicinity

of Denver which are unirrigated and untilled, because of lack of water, not obtainable under present conditions.

I once managed an irrigation project whose business it was to sell water rights. That was many years ago, in the Montezuma valley, which is a long ways from Denver. There is a difference between conditions in the Montezuma valley at that time and those existing in Denver today. The Montezuma enterprise failed two two or three times. I went down with the first receiver in 1887. It failed again about 1890. That is the only irrigation enterprise with which I have been connected in an executive and managerial capacity.

$40 per acre foot is what I would pay for the water if I were a farmer. I believe I could buy Lake Cheesman water at $35 per acre foot, if that water was to be thrown on the market. I believe I can buy Antero water for $30, but they reserve the right to sell the entire capacity of the reservoir, and Antero under those conditions would be less efficient than Lake Cheesman.

I do not believe I can specify any instance where under similar conditions you could get a like water right to that of Lake Cheesman for any such price as $35 per acre foot, that is as storage water; but I could go under ditches that furnish as good a supply as Lake Cheesman and get irrigated land at prices that would approximate the same amount; land as good as that around Denver, and in the irrigated valleys around Greeley, Boulder, Longmont and Loveland, under the older ditches, such as the Brantner, the Lupton, etc. It happens that in the vicinity of Denver there is as much lack of water as there is in the vicinity of any large town in the state.

I know of the Pleasant Valley district near Greeley, and have heard that Bruce Eaton, son of Governor Eaton, and one of
763 the largest landowners in Colorado, has in the last few years bought hundreds, and perhaps thousands, of acres in that district and paid therefor exceeding $200 or $250 an acre, but that purchase carried with it water rights, improvements, etc. Those prices are no measure of the value of the water alone, and it is upon that assumption that I have come to my conclusion as to the value of Lake Cheesman water.

Have been a partner of Mr. Field's for a long time, and was associated and participated with him in the preparation of the reports filed with the old board of appraisers. I did not participate in the preparation of the Bates report, but have read it over since its preparation. Have never compared my opinions or conclusions with those expressed by Mr. Field in the Bates report.

(Attention of witness is called to statement in the Bates report as follows: "It is conceded at the onset that the demand for water is in excess of any possible development, and that the sale of water can be made, with little or no expense, to the full amount of the supply, at the present values of such water privileges, that the development of any or all of these reservoirs will in no wise depress the present prices." Objected to. Objection sustained. Exception.)

I participated in the recent report made to the Public Utilities

Commission by its committee of engineers. I was chairman of that board of engineers. That report, at page 217, states: "In this connection, especial attention was also given to the following obvious facts: * * * 2. The uncultivated and even unoccupied condition of vast tracts under canals near Denver, this condition being due solely to an insufficient supply of water. 3. The undeveloped portions of the Henrylyn, Denver-Greeley, East Denver and other irrigation districts in this locality, which will require increasingly more water for many years, if it is in any way available * * * 5. The obvious need of more water for irrigation in the vicinity of Denver, rather than less." I subscribed to those statements. Nevertheless it is my opinion that the cost of marketing Lake Cheesman water will be approximately $5 per acre foot.

The difference between the operation of the reservoir on the 40,000 and the 50,000 acre foot draft, which causes a difference in price per acre foot of $7, is: (1) with decreased efficiency the value would be less; (2) with more acre feet to be sold the time required for disposing of the water would probably be greater, and the overhead charges consequently greater. On the 50,000 acre foot draft the water might be sold at a gross price of $32.50 or $33 per acre foot. I am inclined to think that the difference per acre foot between that and the 40,000 acre foot draft would be
764 $7 or $8. I am inclined to think there would be that much difference in actual return to the company at least. My estimate is based entirely upon the value to the company. As between the gross selling price per acre foot, that difference might be a little high, but I think it will approximate that. My judgment upon that point is not based upon any actual knowledge of differences in price created by differences in efficiency. I have no knowledge of any parallel cases. I have not myself had sufficient experience in marketing water rights from reservoirs to know what difference in selling price is brought about by a given difference in efficiency.

Exhibit A-67 is a transcript of the tables relating to Lake Cheesman employed in the report filed by Mr. Field and myself with the former board of appraisers. I have made no comparison of the estimates of canal demands stated in Exhibit A-67 with those shown in this case in my Exhibit 44, page 12.

My estimates of the total available storage in the years 1900 to 1904 as shown by Exhibit A-67 differ materially from my estimates of the total storage now made, as shown by Exhibit 44. The basis is entirely different. My determination in 1908 was not necessarily wrong. I would not say that my present estimate is necessarily incorrect. All these matters are estimates. I think it is true of every estimate that has been made that there is a considerable margin of error, or possible error, which must be taken into consideration, both in the basis, the method and the application of the method. I believe that on the average my estimate would be found to be most nearly right. I think the basis used by me is upon the average more accurate than any of the other bases. The basis which I have taken is, as already stated, the year 1913.

In our report to the former board of appraisers, and upon consideration of tables A-67, based upon an assumed draft of 45,000 acre feet, we concluded that the reservoir would not stand an annual draft greater than 40,000 acre feet. In that connection we stated in our report: "We find that there is an aggregate deficiency in the five years of about 40,000 acre feet, or 8,000 acre feet per year. We are justified in taking a certain amount of risk of shortage, and in occasionally asking the farmer to do with a little less than the average amount. Assuming that the justifiable deficiency is 3,000 acre feet per annum, we have left 8,000, less 3,000, or 5,000 acre feet of deficiency which is justified, and deducting this from the average assumed, 45,000 acre feet, we find that the maximum average which we are justified in selling is 40,000 acre feet per annum." I have not applied any such consideration as that in the present case.

765 As shown by Exhibit 44, on the 40,000 acre foot draft the annual deficiency would be about 1,700 acre feet. That is much less than the 3,000 acre feet which I said I was justifiable in my former estimate. Taking in 1899 and 1914, making a total period of 16 years, the average annual deficiency would be only about 1,500 acre feet, which is just about one-half the deficiency which in 1908, in advising the board of appraisers, I said was justifiable in making sales to the farmers. That does not necessarily indicate that the reservoir under my present estimate ought to be operated upon a larger annual draft than 40,000 acre feet. Upon my present estimate, as shown by Exhibit 44, even if we operated upon the 50,000 acre foot draft, the result in the period of 16 years mentioned would be an average annual deficiency of a little over 3,000 acre feet. Nevertheless, from my present point of view I would not be justified in adopting the 50,000 acre foot draft. I have changed my point of view to some extent. I think I am a little more conservative than I was in 1908; I think all engineers are.

In 1908 we applied a unit price of $40 per acre foot to the entire 40,000 acre feet, but in our supplemental report of January 20, 1908, we applied to an average available capacity of 35,000 acre feet a unit price of $30 per acre foot, stating: "This valuation per acre foot results from deducting $10 per acre foot for the purchase and construction of transportation facilities for the delivery of the water."

In the present case, in assigning values to Lake Cheesman, I have taken into consideration what the farmer would have to pay for the construction of canals for the delivery of the water.

In our report to the appraisers in December, 1907, we valued Lake Cheesman, as an entity, at $1,600,000, upon an assumed draft of 40,000 acre feet at $40 per acre foot. Even at that value we stated: "It may seem surprising that this famous reservoir's value for irrigation purposes is not in excess of its cost."

In a later report, dated January 20, 1908, we reduced total value of Cheesman to $1,050,000, an average available capacity of 35,000 acre feet at $30 per acre foot, as stated above. Mr. Field swore to both reports. I have now gone back to the average yield because the average stream flow is now found to be more than we then thought

it was. I have not changed the unit price because of the granting of the decree and seven years of actual use.

I became a member of the Public Utilities Commission in June, 1910. Between that date and September 10th I proceeded to make a preliminary estimate of the cost to the city of building a new water plant. That estimate included the acquisition of the Bates
766 or Highline reservoir. I had before me at that time Mr. Filed's report Exhibit A-66, upon the Bates or Highline reservoir. I used that reservoir as a basis in making the estimate.

In my report to the former board of appraisers in 1907 I stated: "It has been shown in the discussion of Lake Cheesman's rights that little, if any, water is available in the south fork after 40,000 acre feet per year have been furnished from that reservoir; hence in further discussion of storage possibilities on the South Platte river only storage sites which derive their supply from the north fork will be considered. * * * Upon an investigation of the records of the discharge of the South Platte at Deansbury it is seen that there is available for storage purposes, after all demands of prior rights in districts 2 and 8 have been satisfied, an average amount of approximately 16,000 acre feet per annum." In our later report of January 20, 1908, we were obliged to reduce even that draft upon Lake Cheesman, because of reduction of the available storage for Lake Cheesman which we had found.

In January, 1912, I testified in the case of the New York Trust Company against the City and County of Denver. In that testimony I dealt with the estimate of $7,000,000 for the construction of a new city plant, and described the Bates reservoir as the one proposed for the purposes of that estimate. In that testimony I stated in substance (exact quotation in original transcript) that for the purpose of making that estimate we used the Bates reservoir site on the south fork of the South Platte, and that "Mr. Field of my firm had recently made a report—a preliminary report upon that reservoir site, and I took his figures." The report of Mr. Field referred to is Exhibit A-66. I presume I knew of that report on the Bates reservoir shortly after it was written. In the summer of 1910, for the purpose of estimating the cost of a new plant for Denver, I adopted and made use of Mr. Field's conclusions regarding the Bates reservoir. In my testimony in the New York Trust Company case, given in January, 1912, speaking of what I did in the summer of 1910, I said that the storage reservoir contemplated in connection with his estimate of the cost of a new city plant was the Bates reservoir, with a capacity of 107,000 acre feet.

In my testimony in the New York Trust Company case, in January, 1912, I said in substance, speaking of this Bates reservoir, that it contemplated securing a portion of its supply from the North fork; "I think an average flow of about 30 cubic feet per second of time;" that a conservative estimate of the supply from the north fork would be an average of 30 cubic feet per second; that the feeder canal would have a carrying capacity of 300 second feet, and
767 that I would hope to secure from the north fork an average supply of 30 second feet, "and I believe a great deal more."

An average supply from the north fork of 30 second feet would produce in a year about 22,000 acre feet. The difference between that and the 15,000 acre feet stated in the report to the former appraisers as the limit of the north fork supply is not so very great. The estimates were conservative, and naturally I hoped to secure more, as we always do when we make a conservative estimate.

In my testimony in the New York Trust Company case I also stated that this Bates reservoir, in order to be filled with water, would not at all need the supply from the North fork. I then testified in substance (exact quotation in original transcript) that personally I had never thought it essential to construct the feeder ditch from the North fork; that such feeder ditch was not at all necessary to the success of our plan, and that according to my ideas we could really have our water supply depend solely upon the waters flowing in the south fork of the South Platte river.

In my testimony in the New York Trust Company case I also said in substance (exact quotation in original transcript) that the principal source of supply for the reservoir would be from the south fork of the South Platte river, upon which the reservoir is located, and that I thought the south fork would furnish an adequate supply for that reservoir, in connection with the diversion from the north fork; that for that purpose I expected to get from the south fork of the South Platte 40 or 50 cubic feet per second, and that I thought that was available. Notwithstanding that testimony, I am inclined now to doubt whether there is that quantity available for such a reservoir in the south fork of the South Platte, subsequent in point of time to Cheesman and Antero.

I do not know what occurred between the time I reported to the former board of appraisers in 1908 and the time I was estimating the cost of a city plant in 1910 to cause me to change my mind about the supply of water available for storage in the south fork of the South Platte.

As to what has occurred since 1910, when I made that estimate, and since January, 1912, when I testified in the New York Trust Company case, which has again caused me to change my mind about the available storage water in the south fork, "six years have occurred since 1908, four years since 1910 and two years since 1912."

40 or 50 second feet would furnish in the course of a year over 36,000 acre feet. In 1910 and in 1912 it was my opinion that a reservoir, such as the Bates reservoir, and at its location in
768 the south fork of the South Platte, subsequent in point of time to Cheesman and Antero, and subsequent to numerous other reservoirs which have intervening priorities after Cheesman, would be enabled, nevertheless, to get on the average each year 36,000 acre feet from the south fork of the South Platte. I doubt now if there would be as much surplus as that. I have modified my opinion to some extent.

In my testimony in the New York Trust Company case, in January, 1912, I stated in substance (exact quotation in original transcript) that for the reservoir I expected to get at least 40 cubic feet per second from the south fork of the South Platte and that that was

independent of the water rights of The Denver Union Water Company and regardless of and over and above their storage rights for Lake Cheesman.

The Bates reservoir, concerning which those statements were made as to the opportunity of getting such a supply of storage from the south fork of the South Platte, would be subsequent in point of time not only to Lake Cheesman, but also to the Antero, and to the storage rights of numerous other reservoirs which have been built since Cheesman was constructed.

Exhibit 44, page 38, considers certain of the water rights by groups. Group A includes the Platte Canon ditch, and also rights at or near the mouth of Platte Canon. I have estimated the yield of those rights according to the diversions actually made by the Denver Union Water Company at those points in the year 1913. I have estimated that the yield, measured by the diversions, for the months of January, February, March, April, November and December would be stored in Marston Lake, and valued it at $30 per acre foot. I have estimated a less unit price on this and on Cheesman water than on the yield by the Bear Creek and Turkey Creek rights, because: (1) the right would have to be changed to storage rights and a decree obtained; (2) the water is diverted by a wood-stave conduit; (3) the water could not be used directly on lands under the High-line ditch; (4) the loss in transportation on this water would probably be greater; (5) some of the water is obtained rather from the late claims of the company than from the decreed rights of the Platte Canon ditch. I considered that the water stored in Marston Lake from the Platte Canon supply would have to be transported to some other location. Marston Lake is located in the immediate vicinity of the lake in which I proposed to store the water yielded by the Bear Creek and Turkey Creek rights.

The cost of maintenance of a wooden conduit will be greater than the cost of maintenance of an irrigation ditch. One reason I made the reduction in price is because I believe the works now employed
for the development and diversion of that water are not
769 really the proper kind of works for irrigation uses.

Although I have first reduced my unit price because that conduit is used to divert the water, nevertheless I think it fair in finding the net value of the water to deduct the gross reproduction cost of the conduit.

As to the summer flow of the rights listed in group A, I have measured the yield by the actual diversions made by the Water Company in the month of May, 1913, as shown by table 13, page 11, Exhibit 44, to which, after deducting what I considered necessary for the Lehow, Hugens and Shellabarger claims, I have applied a unit price of $2,000 per second foot. That is equivalent to $5.43 per acre foot for the yield of those rights, according to my estimate of the flow during the irrigation season. That might be a very low valuation if you had provision for storage and means of delivering it to the land, etc. I have estimated the yield of the Bear Creek and Turkey Creek rights, stored in the water company's reservoirs, at $35 per acre foot. I think the difference betwen $35 per acre foot

and $5.43 per acre foot fairly represents the difference in value between direct flow rights and storage rights, under the conditions there existing. Water which is furnished in May and June, and possibly to some extent in July, is worth less than water which is stored and can be used later in the season. Water delivered during the months of April, May, June and July, practically as a direct flow, is worth less than stored water which may be delivered later in the season. I have estimated the value of the reservoir supplies of The Denver Union Water Company as sole supplies, and not as supplemental supplies.

As direct flow rights, the Platte Canon Ditch rights, taken by themselves and sold as irrigation rights, might be worth a little more than $2,000 per second foot. Real estate men have told me that they could get such water at prices not exceeding $2,000 per second foot. I remember I was told that I could get such rights in the Nevada ditch and in the Brown ditch. "Q. Who told you that you could get such rights in the Nevada ditch at $2,000 per foot?" (Objected to. Objection sustained. Exception.) The best offer, and practically the only offer, I ever had of rights in the Nevada ditch was made by a Mr. Malone. Malone's offer covered the following rights in the Nevada ditch: priority of August 30, 1861, 7.54 second feet in the Nevada ditch; priority of November 30, 1865, 9.24 second feet in the Last Chance ditch; priority of March 3, 1868, 12.07 second feet, making a total of 28.85 second feet. Those priorities are almost entirely subsequent in point of time to the priorities of the Platte Canon ditch. I testified in the New York Trust
770 Company case about the Malone offer as follows: "The offer was made on the basis of $5,000 per cubic foot per second." If I made that statement I was probably correct at that time, and I am not correct now.

In arriving at my conclusions as to value, I have taken into consideration that some of these rights have not existing decrees, or that there is some necessity of change of use from domestic to irrigation use, and that there are other like matters requiring adjudication. I do not know how much additionad value I would estimate if decrees for irrigation purposes actually existed. I have taken into consideration a number of things of that sort, which have caused me to reduce the values on these rights, among others the following: that while the Platte Canon ditch has diverted to its full capacity, the water has not been used to a great extent for irrigation purposes for many years, and I cannot say whether the water so diverted was that to which the ditch was entitled; I have taken into consideration the necessity of changing the use from domestic to irrigation use in respect to some of these rights; the necessity of getting a decree for these rights, and other things of like character. If the water company actually had decrees entitling it to make diversions for irrigation purposes at the rates at which it has in the past actually diverted water for other purposes, I might assign higher values. I have no means of knowing what sort of decrees would be given. Because of the existence of these considerations I have assigned less values than I otherwise would.

Exhibit 44, page 38, items 5 and 6: the original diversion of item 5 was 1870, and of item 6 1878. These are early diversions. Even that of 1878 antedates the Highline Ditch, and since the intake is situated further down the stream, these rights have the advantage, which the Highline does not have, of the accretions to the stream and seepage coming in in District 8. In assigning my value here I have in mind that there are no decrees for these old rights, and particularly that they are not decreed as irrigation rights. Therefore I have assigned a value to the second foot rights of the Highline of $1,250, and to items 5 and 6 a value of $100 per second foot of the actual delivery in 1910, although the Highline is later in point of time and so situated that it cannot receive the seepage and inflow.

In my report to the former board of appraisers I valued item 5 at $1,200 per second foot for 2.05 second feet, in the original report, but marked it "Questionable—Abandoned." In that report I valued item 6 at $1,000 per second foot for 30 second feet, but marked it "Questionable." The total was deducted from our former valuation.

771 As to item 7, Cherry Creek right, we valued that in 1908 at $1,000 per second foot for 10 second feet, making a total of $10,000, but marked it as "Questionable." However, in our later report of January 20, 1908, we eliminated the word "Questionable" and gave to the Cherry Creek rights a nominal value of $100 per second foot for 10 second feet.

I have taken as the basis for the valuations which I have assigned to all of the water rights in the present case what I deemed to be the irrigation values. The values which I have assigned here have in no sense exceeded what I deemed to be the value of the rights for irrigation purposes. Moreover, I have in the main assumed, for the purpose of applying this irrigation value, that there must have occurred an actual change in the status, so that the rights, instead of being used as a supply for the city of Denver and its inhabitants, as they are now used, will be placed in such a situation that they can be and will be and are being used as a supply for irrigation purposes. I made that assumption in practically every case. In that connection I took into consideration the difficulties, the loss, the expense and the overhead charges, and other like matters, which I assumed would be involved in bringing about such a change of status. In other words, my estimates of value represent what in my judgment the Water Company would obtain net if it were obliged to so change the status and to dispose of the rights for irrigation purposes. Moreover, I also took into consideration the effect upon the market for irrigation water rights of suddenly placing upon the market such a large body of rights as are here represented. I think the values which I have assigned to the water rights are analogous to what engineers term junk value or scrap value. It might under some conditions be possible that, with a change in the character of the use, their value would amount to more than their value for the purpose for which they are being used; but I am not undertaking to say that the value which I have here assigned to the water rights for irriga-

tion purposes exceeds the value of such rights for the use to which they are now devoted.

After having arrived at these values by the method described, it is my theory that there ought to be some deduction therefrom on account of the structures to arrive at what I would designate the net value of the water rights. I think that deduction in each instance ought to be the gross reproduction cost of the structure, without taking out depreciation. The structures which I think ought to be deducted are those which are necessary to provide and furnish the water right for irrigation purposes—not necessarily the structures that are now used for delivering water to the city of
772 Denver as a domestic supply. It is generally true that for irrigation purposes water rights are developed and made useful by means of structures which are less expensive than the structures which are required to develop and make useful the same water rights for domestic or city purposes. I think the structures to be deducted should be the structures as they exist, so far as those structures are necessary to develop the water and make the water useful. Starting at the point at which the water becomes available, the structures might properly be changed to the character of structures usually used for irrigation purposes.

It may be true that upon these assumptions the value which I have assigned to the total entity is in a number of cases less than the reproduction cost of the structures to be deducted. Viewed in that light, some of these water rights are worse than valueless; they are worth less than nothing for irrigation purposes. But in that regard, I confine my judgment to the value of the water for irrigation purposes. That is the only consideration which I have given to the matter. I certainly do not think that these water rights are worth less than nothing when viewed as water rights used and useful as they are today for the purpose of supplying the city and county of Denver and its inhabitants with water. Some of these water rights may be worth more for the purpose to which they are now devoted than for irrigation uses, and some may not.

In my report to the former board of appraisers dated December, 1907, I stated: "It may be argued that water for domestic and municipal purposes has a higher value than obtains for agricultural uses, and this is true." It is undoubtedly true that water used for the domestic supply of a city is applied to a higher and more valuable use than irrigation, and will stand, if necessary, a higher cost. In other words, to make my meaning plain, my opinion is that water for domestic purposes is worth what it costs to get the water. It might be a very much greater cost than the ordinary irrigation cost. I am not questioning that the value of the water from the various sources of supply is what it cost to produce for domestic purposes. In my opinion that value would be limited to the amounts properly chargeable against the structures, including in that amount cost that may have been entered into in purchasing water rights. I call that a part of the cost of construction. If the cost of acquiring the water rights has been paid for by the consumers out of rates, no addition should be made for the water rights.

My theory amounts practically to this: that the water company is in no event entitled to a return upon the actual present value of the water rights, but only upon the cost thereof, and that
773 it is not entitled to a return even upon the cost if it has received that back in rates previously charged. The theory is that what a utility is entitled to have a return upon is the actual cost to it of the property which is devoted to the public service. I believe that to be the case. In my judgment the value of these water rights for the purpose of rate making ought to be the cost which would be incurred in acquiring them, if that entered into the construction cost.

I am of the opinion that the more nearly you can approach original cost the better the basis, and that the only excuse for using present day cost is the absence of information as to the original cost. I have given some consideration to what it would cost at the present day to reproduce these water rights, or to produce rights of the same efficiency for the supplying of the city and its inhabitants. The supply of the South Platte river and its tributaries is overappropriated.

If at the present time some one undertook to construct a water works plant to supply Denver and its inhabitants, he would, in addition to constructing the physical component parts of that plant, have to acquire water rights. If he got them from the South Platte river or its tributaries he would have to obtain them to a considerable extent by condemnation or purchase. Unless he purchased or condemned the rights of the water company, which are now devoted to the domestic supply, he would have to purchase or condemn rights which are now devoted to agricultural and irrigation purposes. He would have to pay for them at irrigation prices. Unless he bought only a portion of the supply of each irrigation enterprise, he would have to pay not only for the water rights, but also for the structures which he put out of commission. He would probably also have to pay in addition damages on account of the lands which he had thus deprived of their water supply. After that he would have to go through the legal process of changing the use from irrigation to domestic, the time of diversion from the irrigation season to all the year round, and the point of diversion to such point as would make them available for use in Denver. All of these things would involve expense, losses of quantity of water obtainable at the changed point of diversion, possible collision with other rights, especially in the change from direct irrigation use to storage or all the year round use. That would occur to some extent; I do not know to what. That proposition is beset with some legal questions about which I do not feel qualified to express a definite opinion. It is in general true that all of these things would cost the man providing a new water system for Denver not only the original irrigation price or value of the rights, but all of these other matters of expense
774 and overhead cost. Moreover, it would undoubtedly cost time and money to assemble these rights. The money which had been invested from time to time would be dead capital until such time as all of the property had been assembled, the plant completed

and put into actual earning shape. Then in addition to having purchased water rights at irrigation rates, and in addition to having incurred all the additional expenditures mentioned above in respect thereto, such a man would have to construct his water works structures.

It follows that, viewed as a present day cost, and measuring value by that, the value of the water works structures and the water rights, considered as an entity, is the sum of the reproduction cost of the water works structures, plus the irrigation cost of the water rights, plus all of these other overhead expenses, interest during construction and other like expenses referred to above in connection with the water rights.

If I were making an estimate on the cost of water for domestic purposes and for use in the city, I should be working upon an entirely different basis from the basis outlined to arrive at the conclusions here announced as to the value of these water rights for irrigation purposes, concerning which I have been testifying, and I would have treated it in a different way.

The only thing which the Public Utilities Commission is now authorized or required to do is the building of a new plant and the providing of a new water supply for Denver and its inhabitants, wholly independent of the plant of The Denver Union Water Company. From that point of view, it is a potential possibility that the city, acting through myself as public utilities commissioner, will be a purchaser, or is a prospective purchaser of water rights. I am therefore, on behalf of the city, a potential or possible purchaser of water rights. As public utilities commissioner, it is my duty, and it is to the interest of the city, to obtain such water rights at the lowest possible price.

Redirect examination:

Although it has been my experience and observation that water commissioners' reports are not always entirely accurate, nevertheless I have used them in making up my computations and determinations in this case, because the water commissioners are state officers, regularly appointed, and charged with the duty of distributing the water and of compiling data, and I know of no other records than their reports which are more accurate, or which are even sufficient to be utilized in such an investigation as this.

775 The work of my assistants in this case was done under my direction and general supervision. The general scheme was outlined by me. The principal assistant was W. L. Reynolds.

The Highline Ditch has a decree for 1184 second feet and a capacity of about 600 second feet. So far as my knowledge goes there have been no additional acres brought under cultivation solely by virtue of the Antero additional rights. My knowledge regarding the acreage under that ditch is derived from the official reports of the water commissioner and from statements made to me by officers of the ditch.

It is my understanding that the amounts returned to the river from the ditches through their waste ways are intended to be in-

cluded by the commissioners in the amount credited to accretion, return flow, seepage, etc. If there is an accretion by virtue of such return flow, it would appear in the stream flow discharged from the district. It is my opinion that the loss caused by conveying such water through a canal would be less than the loss in the stream bed, particularly at low stages of the stream.

In general practice, so far as water commissioners' reports are concerned, and also in engineers' estimates on irrigation enterprises, duty of water is determined by measuring the diversion at the headgate. To determine the quantity actually applied to the land deduction must be made for loss in transit. This will vary in different localities, in different ditches, and in different amounts of water.

In determining whether the quantity diverted at the headgate of a ditch represents a wasteful or unnecessarily large diversion, one must consider the character of the soil, the character of the crops, the size of the lots to be irrigated and the distance to which the water is to be conveyed, as well as the character of the ditch and the means provided for the quick return to the river of any excess diversion.

Exhibit 44, page 9, table 11; the diversions of the Burlington ditch were used in my computations and determinations, particularly for the months May to October inclusive.

Because of the change in the Fort Morgan Land and Reservoir Company's ditch decree, we must take into consideration the additional quantity specified in that decree as a demand of District No. 1 upon District No. 2.

The Union ditch is used for conveying water to the Lower Latham reservoir, also for direct irrigation. I have looked into the records to see whether they contained any statements of diversions of this ditch in the summer months for storage purposes, but found no record of any such supply. The same is true as to the Evans No. 2 ditch.

776 Exhibit 44, table 7, page 6, was not used for the months of January, February, March, April, November and December in arriving at my conclusions as to demand upon the river.

Exhibit 44, page 3, table 4: discharge of the South Platte in April 1905 was obtained by expanding actual record of flow for 25 days to 30 days, yielding 33,500 acre feet, to which was added 15,147 acre feet understood to have been stored in Lake Cheesman, making a total of 48,647 acre feet.

In my investigation of 1910 relative to the use of the Bates reservoir for city supply, I had in mind the possible utilization of the flood flows, surplus water, and the possible purchase of water rights to be stored, and the possible transfer of portions of the rights belonging to the city for storage at that point, and the possibility that the claims of The Denver Union Water Company might not be supported by decisions of the courts.

In 1908 the basis of my estimate was irrigation value only, and the rights were considered as claimed by the water company, some allowance being made based on our opinion of the amount that could be obtained from those claims.

In making my present determination I have considered the

claimed rights of the water company, the basis taken being the amount of water used by the company in 1913, and the estimate of value being for irrigation purposes only.

The most natural place to use the yield of item 7, Cherry Creek right, for irrigation purposes is on lands in that locality. If the yield of that right was carried in a ditch by itself for a considerable distance, it is presumable that a very large portion of the water would be lost.

The offer which I testified about of 28 and a fraction second feet of Nevada and Last Chance ditch rights at a price of $5,000 per second foot, was at a gross price for land, water and improvements. All of these things entered into the amount of $5,000 per second foot.

Recross-examination:

As to the offer made by Malone to sell Nevada and Last Chance ditch rights, I do not remember whether I testified in the New York Trust Company case that that was a proposition to sell water rights alone at $5,000 a second foot, but I believe the fact is as I have now stated it. In the New York Trust Company case I testified in reference to said transaction in substance as follows (exact quotation in original transcript): "that the price made upon the water right was independent of the price of the land; the offer made to Mr. Malone was for both land and water;" that the offer at the rate of $5,000 per cubic foot per second for the water alone was an oral offer, made by Mr. Malone to me individually. My former testimony plainly says that the offer was at the rate of $5,000 per cubic foot
777 per second for the water alone. I stated in my former testimony in the New York Trust Company case that the offer made by the owner to Mr. Malone covered both the land and the water, but that the offer made by Mr. Malone to me covered the water only, and was at the rate of $5,000 a second foot. Now that my recollection has been refreshed, I do not remember whether or not that is the way it occurred.

As to my examination of the Bates reservoir in 1910, and my testimony on redirect examination relating thereto: when I spoke of the utilization of the flood flows I meant to impound in that reservoir any unappropriated water that might flow in the south fork of the South Platte and through the feeder ditch. When in my testimony in the New York Trust Company case I referred to flood flows or flows directly from the river, I presume what I had in mind was such unappropriated water. At that time I had before me Mr. Field's Bates report, Exhibit A-66. Undoubtedly I took into consideration his estimates there made as to available storage and accepted them as an opinion to be considered in connection with other information.

When in my redirect examination I referred, in this connection, to the possibility that the claims of The Denver Union Water Company might not be supported, I meant that there might be some question about the right of The Denver Union Water Company to convert Lake Cheesman from a domestic to an irrigation reservoir. I do not know whether or not I had that matter in mind when I was

giving my testimony in the New York Trust Company case. I believe I testified at that time that my estimate of storage in the Bates reservoir was over and above and independent of any such consideration. I then testified in substance (exact quotation in original transcript) that I expected to derive 40 cubic feet per second from the south fork of the South Platte, independent of the water rights of the water company, and over and above their storage rights for Lake Cheesman. I still believe it would be possible to secure as much as 40 cubic feet per second without acquiring any of the water company's rights. In making that estimate I eliminated from consideration the matters mentioned on redirect examination.

Exhibit 44, page 3, table 4: In figuring up available storage for Cheesman as influenced by the flow of the South Platte river, as shown by this table, I took the figures shown for the individual months whether the same were followed by a star, a prime or two primes.

Exhibit 44, page 6, table 7: What I meant in redirect examination when I said that I made no use of what appears there respecting the months January to April, inclusive, and November and
778 december of each year, was that the inflow in those months was sufficiently large to offset all demands below, except the demands of the water company for its direct diversion.

Exhibit 44, page 9, table 11: When on redirect examination I said in respect to the Burlington ditch that I made no use in my computations of the diversions in the months of January, March, April, November and December, what I meant was that in those particular months the inflow afforded a quantity entirely sufficient to offset the demands for irrigation, so that the Burlington ditch diversions would not amount to a demand on the canon. But I did make use of the diversion of the Burlington in October, 1913, and that contributed to the demand on the canon as estimated by me.

When a ditch is running at its ordinary capacity, I think there is less loss in transit that when the water is carried in the river. I think it might often occur that the loss in transit by such ditch conveyance would be less than the loss in the South Platte river in Districts 8 and 2, particularly with a comparatively small flow in the stream.

As to the increase of acreage under the Highline, and whether it has been caused by additional water furnished or expected to be furnished from the Antero reservoir, I have made a computation showing the number of acres cultivated under said ditch, as reported by the water commissioner, in the years 1909 to 1913 inclusive, and find that there was a rather regular increase. I do not think the expectation of Antero water dated back to 1909; possibly to 1910. There has been no considerable increase in acreage since 1909, and the increase has been rather gradual. I have no personal knowledge regarding this matter acquired by personal examination. I have only these reports of the water commissioner, and information obtained from one of the officers of the company.

I have been very much pressed for time in preparing for my testimony in this case on the subject of water rights. Since this case began I have been constantly in attendance in court, day in and

day out. Between the time of my reports to the former board of appraisers and the present hearing I have been acquiring such information as I could bearing on water rights in the South Platte, but have not made any particular investigation (until I did so for the purposes of this case) as to the rights of The Denver Union Water Company. So far as my investigation in immediate connection with this case is concerned, it has all occurred since the case began and the taking of testimony started. To a large extent my time has been spent in sitting in the court room and listening to the testimony of the various witnesses. Owing to the necessity
779 of my being in daily attendance here, a large part of the work of gathering specific data, tabulating it, etc., for the purpose of this testimony and the preparation of Exhibit 44 has necessarily been confided by me to assistants, of whom the principal one was Mr. W. L. Reynolds.

I testified on redirect examination that I found nothing in the water commisioners' reports to indicate that the water diverted in the year 1913 by the Union and Evans No. 2 ditches was used for storage. It is also true that I found nothing in those reports to indicate that the water so diverted, or part of it, was not so used.

Redirect examination:

Exhibit 44, page 3, table 4—December, 1902: the exhibit is in error; the quantity should be 2,600 acre feet instead of 17,700. That correction would decrease the percentage of that year to approximately 39.

Exhibit 44, page 14—December, 1902: should be corrected accordingly. This would eliminate the available storage for that month and reduce the total available storage for that year to 12,081. This error is carried along somewhat: on page 20, table 16, the amount shown opposite the year 3 should be 12,081, instead of 12,942, and the average at the foot of the column 48575, instead of 48,636; on page 23, second half of page, 861 opposite the word December should be eliminated, reducing total at the foot of the column to 8,071, instead of 8,932. In that table also the elimination of 861 for December would reduce the amounts following that month in the column "Amount in Reservoir" accordingly, and increase the deficiency in August by 861. Similar corrections will have to be made in the tables relating to the 50,000 acre foot draft.

Exhibit 44, page 3, table 4: figures for May to October, inclusive, in 1902, arrived at by taking recorded stream flow and adding actual storages at Lake Cheesman.

Exhibit 44, page 9, table 11: using the diversion of the Burlington as stated in that table the duty of water in District No. 2 would be 3.41 acre feet per acre irrigated; under the assumption that the Burlington diverted under its own direct irrigation priority 22,000 acre feet, that duty would be 2.7 acre feet per acre. Combining this total duty with the duty in District 8 according to the actual diversions in the latter district, gives an average duty of 2.86 acre feet per acre. As to District No. 2, considering acres irrigable as reported by the water commissioner, instead of acres irrigated, an average

duty in District No. 2 results of 3.24 or 2.57 acre feet per
780 acre, depending upon whether we use the full diversion as made by the Burlington or only 22,000 acre feet thereof.

As to District No. 8, on the basis of irrigable lands, estimating the irrigable acres under the Highline ditch, exclusive of East Denver Municipal District, as 50,000 acres, I found that if all of the lands covered by the ditches in District 8 were to be irrigated with the amount of water diverted in 1913, the result would be 1.93 acre feet per acre. Combining Districts 8 and 2 upon the basis of irrigable acres instead of those actually irrigated, gives an average duty of 2.75 acre feet per acre upon the entire diversions for 1913, and 2.33 acre feet per acre using 22,000 acre feet as the diversion of the Burlington.

Recross-examination:

I did not look up to see what was claimed as the acreage in the East Denver district, but for the 90,000 acres stated in the water commissioner's report as the quantity irrigable from the Highline ditch I substituted 50,000 acres. I mean by that that that is the number of acres lying under the Highline canal proper, without its extension, and which could be irrigated if the canal could get water for that purpose. What I mean by irrigable acres is irrigable in a physical sense—that is, the acres which lie below the canal. That is purely a computation. I did not take into consideration the ability of the ditch itself to divert water, considering its priority and the quantity which the stream affords. I think it is true that the supply of the Highline ditch is so varying and uncertain that farmers cannot rely upon waters from the Highline sufficiently constant in supply to irrigate 50,000 acres. The statements in the water commissioners' reports as to irrigable acres are the estimates made by ditch riders in the employ of the ditch companies and by them stated to the water commissioners.

Exhibit 44, page 9, table 11: Total quantity shown as diverted by Burlington ditch in 1913, 85,000 acre feet. For the purpose of one of my computations I deducted from that 63,000 acre feet. That deduction was made on the theory that 63,000 acre feet had been diverted for purposes of storage on priorities later than Cheesman.

Exhibit 44, page 3, table 4: In determining the discharge of the South Platte river for months April to October, 1902, as recorded in that table, I have taken the stream flows as recorded in the State Engineer's office and added thereto the actual storages at Lake Cheesman on those months as the same appear upon Exhibit 31.

I have examined the hydrograph of actual storage in Lake Cheesman contained in Exhibit 37, prepared and produced by the
781 witness Bull. The quantities added in the various months of 1902 as storages at Lake Cheesman to produce the figures in my Exhibit 44, table 4, do not correspond with the actual storages in those months of that year as shown by Mr. Bull's exhibit. According to the latter exhibit, apparently no such amounts as I have added were actually stored in those months. The quantities which I took were those which appeared upon Exhibit 31, produced by Mr. Field

when he was on the stand. In that exhibit the year 1902 was the first year in chronological order. Whenever, according to exhibit 31, there appeared no figures in the column relating to the outflow from Lake Cheesman in the year 1902, I have assumed that all of the inflow therein recorded was actually stored in the lake. I have some doubt as to whether those are the actual facts as they occurred in 1902. I do not consider it very material anyway. If those amounts should not have been added for 1902, the amounts shown as the stream flow for that year in my Exhibit 44, table 4, would be materially less, and that would still further reduce the total discharge of the river in 1902, and further reduce the percentage of that year as a year of discharge, as also shown in said table 4.

Recalled. Lands and structures.

Direct examination:

I was one of the committee of engineers appointed by the Public Utilities Commission in 1913 to examine the matter of the property and properly values of the Denver Union Water Company, the other members being E. C. Van Diest and C. P. Allen. My work was rather of a general character, to assist in keeping things going; to go over the data as brought in, and to consult with the other members of the committee regarding that data and the compilation of the report; it was rather general in character, and there was no particular part of that I had charge of. Some parts of the narrative report I wrote. All matters involving judgment or policy were discussed by myself and the other members of the committee; the compilations were gone over and passed upon.

We were pressed for time; we were crowded so to get the report done, and the amount of money given us was so small, that we were unable even to have additions checked or proof read, or anything of that kind. The members of the commission were working under a great deal of strain and stress, averaging I should think something like fifteen or sixteen hours a day, in order to get the thing done, even in its present form. Since this suit has been on trial those figures have been rechecked and the calculations have been gone over
782 and remade by Mr. Van Diest personally. I have not rechecked them. That, however, was done at my request and with my full knowledge and consent.

The final figures as set forth in Exhibit 54-19 express my judgment as to values and amounts.

In our estimates we valued certain lands as lands with water rights. We attributed a present day value to the lands and the water with them. The valuation of well-irrigated lands varies from $125 to $150 per acre. Generally speaking, about $60 of that was the water value.

The total estimated corrected value appearing on sheet 6*a* of Exhibit 54 represents my judgment as to the value of the property individually as needed by the city, except there is a doubt in my mind as to the propriety of including paving over mains, and also a doubt as to including the ranch lands. The propriety of including or ex-

cluding those two items is dependent upon legal questions, which I do not feel like passing upon.

As to the items listed for deduction on said sheet 6*a* of Exhibit 54, those represent my conclusions as to proper deductions that should be made.

As to Exhibit 54-25, page 1: It is my judgment that all of the items there listed for deduction should be deducted, and also that the amount left included in the first item of water rights should also be deducted.

(Objected to as calling for legal conclusions. Objection overruled. Exception.)

Exhibit 23, sheet 4—items for deduction: in my opinion the items there listed are proper for exclusion in determining the present fair value of the property used and useful for water works purposes.

Exhibit 54-25, page 1, item 3; also page 2, schedule A; also further detailed schedules A-1, A-2 and A-3; it is my opinion that all of these items should be excluded.

Exhibit 55 is a tabulation prepared by me upon certain assumptions, stated in the exhibit, and showing deficits below or excesses above a fair earning upon those assumptions, as shown by the actual revenue of the Denver Union Water Company. (The table explained.)

The depreciation allowance has been deducted at the end of each year; net value each year has been ascertained by adding the net deficit or subtracting the net surplus, and then deducting the depreciation allowance, calculated at one per cent. This table was prepared for comparison with plaintiff's Exhibit A-19, table 2. This table is prepared simply for the purpose of showing what the
783 result would be in connection with that table if depreciation were deducted annually.

Exhibit 54-19, sheet 6-A, item Development Expense, $375,628: that was obtained by deducting the surpluses from the deficits in revenue in the table to which I have formerly referred, as contained in the engineers committee's report to the Public Utilities Commission.

As to interest during construction on lands, my recollection as to our method of determining that agrees with Mr. Van Diest's statement. Appreciation in the value of the lands entered into that discussion to some extent and was taken into consideration in arriving at our conclusions. As to interest during construction on items other than lands: I heard Mr. Van Diest's testimony, particularly that relating to Schedule G, the distribution system, also his testimony on that subject relating to other portions of the plant. My recollection as to the details is very hazy. "The matters I know were discussed, and I recollect that we used generally six per cent as a basis, and that some consideration was given to bank balances; but as to the particular details, I do not feel that my recollection is good enough to testify." My recollection is that we first applied interest during construction to Schedule G, distribution system, although I am not very clear as to that.

The descriptive matter in the report was prepared mostly a considerable time in advance of finishing the schedules.

Exhibit 55 offered as a mere computation and admitted. Exhibit 54 admitted.

Cross-examination.

I heard all of Mr. Van Diest's testimony, both upon direct and upon cross examination. Generally speaking, I am prepared to accept as my own testimony what was stated by Mr. Van Diest, upon cross examination as well as upon direct examination. The answers which he made upon cross examination to the various questions propounded are practically the answers which I would have made if I had been subjected to cross examination and the same questions asked me.

I have been a public utilities commissioner since the commission was created in 1910. So far as it was possible, I have scrupulously endeavored to observe the duties, obligations and restrictions imposed upon the commission by the terms of charter section 264*a*. That section required the commission to offer to the Denver Union Water Company the sum of seven million dollars in certain bonds of the city for all of the property which had shortly prior to that time been appraised at $14,400,000. That offer was made, but it was not accepted.

784 Section 264*a* further required that in case said offer was not accepted, the commission should proceed to construct an entirely new and independent plant for the sum of eight million dollars, and provided for an election on the subject of issuing bonds to said amount, which election was to be and was held on the first Tuesday in September, 1910 and the bonds authorized.

I entered upon the discharge of my duties as public utilities commissioner on May 31, 1910. Between that date and the bond election the commission made an estimate—I don't know whether you could call it an estimate, although it was an estimate in a way too, but without surveys—of the actual value of the water works system or plant of the Denver Union Water Company. It was made under circumstances which prevented myself and the other members of the commission from making a reasonable investigation of the question, because time was short, and particularly because funds were lacking. That investigation—if it could be called an investigation at all—was, under the circumstances, necessarily extremely superficial. From that time up to the time in August, 1913, when the commission appointed this board of engineers, neither the commission nor anyone on its behalf made anything like a thorough study or investigation of the value of the plant. An opportunity was offered from time to time, parts of the plant were visited and examined, but no estimates of cost or value were made in that connection. In reality, the first real investigation made by or on behalf of the commission was that which began in August, 1913, and was concluded in January, 1914, when the committee of engineers, in-

cluding myself, entered upon the work and made the reoprt which has from time to time been referred to in this testimony.

At the time when I was elected a public utilities commissioner, and during the summer of 1910, and up to the time of the bond election in September, 1910, I entertained an opinion in respect to the value of the plant of the Denver Union Water Company different from that which I have expressed in my testimony here and which is expressed in the report of the engineers of the Public Utilities Commission. I had expressed that opinion in a public way. The opinion which I then entertained and had expressed was that the value of the water plant was very materially less than that which I have now, upon investigation, determined it to be. Upon my subsequent careful, and at least extended, investigation I have found reason to change my original opinion.

During the summer of 1910 the commission employed an engineer, by name Mr. Hiram Phillips. What Mr. Phillips was then doing was to give the commission an estimate on the cost of
785 building the new and independent city plant proposed by section 264*a*. I think that was the main purpose for which he was employed. Mr. Phillips did not spend very much time in that employment—about one month. My recollection would be that he devoted most of that time to estimating the cost of a new plant. I recall that he visited parts of the water company's plant, but that is all, I think, and those visits could not have taken more than a week or ten days time altogether, possibly not that much. Since that time Mr. Phillips has never at any time investigated for the Public Utilities Commission the question of the value of the existing plant of the water company.

The committee of engineers of the Public Utilities Commission commenced its work upon the investigation of the property of the water company and its value some time in the month of August, 1913, and continued it until about the middle of January, 1914. The work was diligently prosecuted. We found it a pretty large job. It takes a long time, and a great deal of continued and difficult and hard work to investigate and try to ascertain the value of a large and complicated plant and system, such as this one. We would have liked considerably more time for the work. We were being urged to complete it, and the members of the commission were concerned about the amount of money that it was costing.

In our estimate of value we included nothing on account of water right values, as distinguished from land values, but as to certain lands which we valued and included in our total, we valued those particular lands as being lands with water. The sum of $93,312 mentioned in Exhibit 54-25, page 8, as "Water Right Values Included" designates the water right values included by the public utilities engineers in these land valuations. That is the total amount which we so included. The details of those inclusions are as follows:

Name.	Allowances. Acres.	Rate.	Amount.	Deductions. Acres.	Amount.
Phebe Strong ranch	126	$60	$7,560	126	$7,560
Wm. Strong ranch	145	60	8,700	145	8,700
Becky Archer ranch	130	60	7,800	130	7,800
Frank Archer ranch	320	60	19,200	320	19,200
Harriman Lake lands	130	25	3,250	130	3,250
Marston Lake lands	740	60	44,400		
Platte Canon reservoir	80	20	1,600		
Harriman Ditch intake	11.84	25	296		
Woodbury lands	20	25	500	19	475
			$93,306		$46,985

786 Except as to the values which I have now described, which were included in those land values, we did not include in our total valuation as found by the committee anything whatever on account of any water right owned by The Denver Union Water Company. We valued land with an adequate water right at about $125 to $150 per acre. We valued the adequate water right at $60 per acre, leaving a land value of from $65 to $90 per acre; but I know of no land without water that we valued at from $65 to $90 per acre.

So far as Armour C. Anderson and Carper had placed values upon these lands, our committee adopted them. I believe that Mr. Anderson and Mr. Carper testified, particularly as to the ranch lands, that they valued them with "slop over" rights only meaning the right only to such water as was available from the Platte Canon ditch after satisfying the demands of the water company for the service of the city. But that was not our understanding at the time we placed our value upon the lands. I think $60 per acre is enough for any adequate water right. The right such as you term a "slop over" right is in my opinion worth very much less than that.

In our estimates we added nothing to the value per acre of any of the lands valued by Anderson and Carper on account of water rights. We simply took their values and incorporated them in our total value. But we understood them to be with satisfactory water rights.

We included in our valuations both the irrigated ranch lands and paving over mains. Whether or not the ranch lands should be included depends upon the legal question as to whether it is advisable to retain them to fully protect and conserve the water rights. Of course if the ranch lands are excluded, the income and outgo connected therewith should likewise be eliminated.

In our valuation nothing was included for the right of carriage of water; on account of water rights only the value of approximately $93,000, as stated above, in connection with land values; for the item of going value no allowance was made, unless the fact that the plant was a going plant was taken into consideration in making

any allowance at all—I mean by that that if it were not a going plant and was not furnishing water it would be valueless. We have added nothing for going value unless the item of development expense ($375,000) may be considered as a part of the going value. I have no doubt that in a purchase case a water plant which has been assembled, and which is actually engaged in furnishing water to a very large number of customers, and which has been so engaged for a long period of years, possesses, by reason of that fact alone, more value than a water plant which has no business
787 and no customers. As to a rate-making case, there is doubt in my mind. When I say it is more valuable, I mean it is worth more, taking all things into consideration; power to furnish water, power to serve the purpose for which it is planned; its efficiency, its cost, and taking into consideration all of the elements of worth for the purpose for which it is planned. As to the cost of bringing a plant to that condition of effectiveness, to the situation of being a going concern, I think in many cases the expenditure of money, time, energy, etc., necessary for that purpose may have been compensated for in other ways. The parties may have been reimbursed. I think that is especially likely to be true in the case of a water plant, more so than in the case of a tramway, gas or electric company. Aside from the rates, the parties may have been reimbursed by the issuance of bonds, or by an issue of stock; or at least in part by charging to maintenance and operation the expenditures which have been made for development, and particularly legal expense. In the case of The Denver Union Water Company, I have no knowledge that the company has been reimbursed in respect to the cost in money, time and effort of establishing its business and bringing it to the point where it is a going concern.

In my judgment, whether going value should be included in a rating case is strictly a legal question. Nevertheless in the present valuation we have excluded it except as it may be included in the item of development expense. There is in my judgment a difference between going value and development expense. In addition to development expense, there is in my judgment a going value, which in a purchase case should be taken into consideration. What the amount of it is or how it should be arrived at I am not posted upon at this time. If the water company at this time actually had a de-nite franchise and a definite contract with the city, I would give it an added value, which I would not call a going value, but rather a franchise value. It would be what the board of appraisers in 1908 called "Business Value" and upon which they placed a value of $100,000. As to the other item upon which the old board placed a value of $1,100,000, I think I would give it such value as we did here in the case of development expense. I think our item of development expense has to do with that value. I think it is an adequate allowance to include that, as well as the other items which it covers.

Exhibit 54, sheet 6-*a*—items which are specifically listed in Exhibit 23: I think these items are not essential to the plant. They

were deducted upon that principle. Some of them are actually used to some extent; that is true of the West Denver pumps. I have not very definite information at hand as to how much use has been in the past and is now being made of those pumps.

788 Some one made the investigation some seven years ago, and we were told at that time that they were used very little. But I have no definite information upon it. I am under the impression that seven years ago, at the time of the former appraisement, we got all the data that we could upon the subject. As to what has occurred in that respect during the last seven years, I made some inquiry of the pump men—engineers, as to the amount the pumps had been used for pumping purposes, but I do not recollect that I obtained anything definite as to the extent to which they had been necessarily used. I do not know that these pumps have been used practically constantly for the purpose of pumping the supply at that station, and that they have actually pumped between 30 and 40 per cent of that supply.

As to the Platte Canon pumps, I believe that they are not actually used, except that one is occasionally used as a sand pump. We excluded them on the theory that they are not at all necessary to the plant. We made some inquiry concerning those pumps from the men at the plant. I could not state just how specific those inquiries were.

Exhibit 54-25, page 1: I stated on direct examination that from my best recollection all of the deductions made on that page were properly deducted. Such deductions really result in the exclusion of a number of things which were actually included in our own total valuation. Our valuation was made as a purchase proposition. Regarding some of the things included by us, I stated that I did not feel sure that they should be included. This valuation was made for the purpose of establishing a rating base. The conditions are a little different. It is a question of law as to whether the deductions made on page 1 of Exhibit 54-25 should actually be made in determining a rating base. I intended to so state. When deduction is made of item 2, page 1, Exhibit 54-25, the result is to take out of the valuation of Metcalf and Anderson everything which is covered in our valuation by the item development expense.

Item 3, Exhibit 54-25, page 1, amounts to the deduction of a considerable number of items of property which we did not exclude in our valuation. In our valuation, which was for purchase purposes, we rather gave the benefit of the doubt to the inclusion, while in the rate making case, unless they were strictly necessary—really necessary in the operation of the plant, we thought it wiser that they be left out. I mean strictly necessary and actually used and useful in the present day operation of the plant. That was the theory upon which I gave my assent to the exclusion here of things which had not been excluded in our own valuation.

789 The matter of excluding the ranch lands depends upon the solution of the legal question mentioned a short time ago. The exclusion of the Lake Archer and canal lands and tail race

depends upon the propriety of excluding the water power pumps at the West Denver station.

Exhibit 54-25, page 1, item 7, covers the exclusion of paving over mains, which we included in our own valuation. Concerning that, I have already expressed the theory that whether said deduction should be made involved the solution of a question of law, which I did not feel competent to determine.

According to Exhibit 54-19, the value of Lake Cheesman land and structures as determined by us is $1,096.969. According to my Exhibit 44, page 38, the value of Lake Cheesman as a water producing entity is $1,400,000. That means a net value of water rights for irrigation purposes of $303,031. The reservoir is now full, and contains approximately 80,000 feet of water. The total net value thus arrived at means about $3.80 per acre foot for the water at present actually in storage.

Exhibit 55 explained. I do not know of any precedent anywhere for the use of such a method as that for determining development expense. It is considered as simply illustrative, and as perhaps a little more detailed and proper way of going into the details than that shown in the report made to the Public Utilities Commission. I would consider the method equitable if the assumption is correct that at the beginning the value of the plant was represented by the outstanding bonds, and if the further assumption is correct that the additional bonds afterwards issued fairly represent the actual additions to the plant. If the original value actually exceeded the bonds outstanding, or if the actual additions were in excess of the amounts of bonds afterwards issued, I would say that the actual amounts of outlay ought to be used.

My own opinion is that the depreciation allowance ought to be deducted annually, although the fact is that that depreciation allowance must be reinvested in the plant for renewals. That is a point upon which authorities differ widely.

The assumption made in this table is that not only are actual additions and extensions to the plant covered by the new bonds issued, but also the renewals and replacements. The assumption is that the additional issues of bonds reimbursed the stockholders for the additional money which they may have put in, no matter whether it was a reinvestment or depreciation allowance or of other money. In other words, that the new bond issues which we made from time to time were sufficient both to keep the plant up and provide the renewals and replacements and also make the additions and betterments. I think you can properly treat the annual
790 depreciation allowance as a repayment of capital, and so deduct it each year from the capital account, and yet not regard it as an investment of new capital to be added to the capital account when it goes back into the plant.

This is simply a method of getting at development expense for a certain period of years. I do not believe that it could be carried on indefinitely in any case. If carried on for a long period of years it might lead to absurd results. Therefore it can be used, as used

here, simply to determine development expense during the early part of a plant's life.

Theoretically, the real function of a depreciation account, such as is provided in said Exhibit 55 by the one per cent annual allowance, is to reimburse the investor at the time of the amortization of the plant for his loss. Depreciation which is to be covered by such an allowance is often made up to a large extent by property which has to be abandoned in the course of the service by reason of being worn out, or by reason of change in the art or obsolescence from one cause and other. That is depreciation as much as the reduced value of the parts still remaining in service caused by their actual accrued depreciation. The theory of this depreciation allowance is that at the end of a given period the owner and operator will be entirely reimbursed for all depreciation, not only the accrued depreciation upon the property still remaining in the plant at the end of the period, but also the accrued depreciation which has occurred by reason of necessary abandonment of property during the period of service. The total allowance for depreciation made in Exhibit 55 amounts to $1,547,652. The accrued depreciation upon existing property, shown by Exhibit 54-19, sheet 15, as determined by the Public Utilities engineers, was $1,072,477. In addition to that, the property necessarily abandoned during the period of service, as shown by Exhibit 14 and by the testimony of Mr. Metcalf amounted to $1,261,000, not including the Sullivan reservoir. Adding that amount to the accrued depreciation on existing property, as determined by our Committee, produces a total of $2,333,477, and if you add to that the Sullivan reservoir, approximately $194,000, which we treated as abandoned property and excluded, an actual total depreciation on the plant during the period is arrived at which would be much more than would be covered by my depreciation allowance as made in Exhibit 55. Abandoned property is depreciation, and must no doubt be taken into consideration, but I would have to look at the list of abandoned property and give it some study before I could draw any conclusions upon it.

791 According to the determination of Metcalf and Anderson, the accrued depreciation upon existing elements of the plant, plus the property abandoned during the period, results in a total depreciation for the period of $2,785,000. It appears therefore, that either upon the basis of depreciation as determined by our committee or as determined by Metcalf and Anderson, the depreciation allowance which I have made in Exhibit 55 is insufficient to amortize the loss by depreciation and make the owner and operator of the utility whole at the end of the period. If therefore depreciation allowance must in my computation be increased, the result obviously will be to very considerably increase the deficit or the sum of the deficits in income and decrease the sum of the surpluses, and thereby greatly increase what I call development expense as shown by said Exhibit 55.

That would be true unless the $7,000,000 with which we started the computation exceeded the actual value of the investment at that time sufficiently to offset the error. On the other hand, if at the beginning of the period the value of the property exceeded $7,000,000,

then my table in Exhibit 55 would be erroneous for that additional reason. To take care of all depreciation, not only in existing elements, but in abandoned property, the depreciation allowance in Exhibit 55 would have to be increased from one per cent per annum to about one and one half per cent per annum. I do not know that that would increase the final deficit. I am inclined to think that it would have the opposite effect. I have not made the computation and do not know that the result would be to increase the deficit or development expense, now shown on Exhibit 55, to a sum upwards of $900,000, but I presume that is correct.

Exhibit 55 limits additions to capital account to additional bond issues. If new investments were made in the plant of moneys not realized from bond sales, they should be added to capital account.

Exhibit 55 also entirely ignores any increment in value, if any such increment has occurred. It deals solely with actual cost, measured in terms of actual investment from bond sales only.

We failed to include in our valuation anything on account of water rights, except said sum of $93,000 of additional value to certain lands, because the matter involves a legal question. The theory was that in valuing this property we should, so far as possible, go back to the conditions which prevailed at the time of the acquirement of the property and value it now under the same conditions and upon the same theory as it was then acquired. That being our theory
792 and our method, what we actually did was to value only those water rights which the company had acquired by purchase and not to value at all any water rights which the company had acquired by original appropriation or otherwise than by purchase. It was considered that the cost of acquiring those water rights was taken care of in the way of legal and operating expense and paid for in that way: that they were acquired by virtue of the authority granted by the people of the city to act for them, and that so far as those rights were concerned the Company was properly a trustee for the city. That method and that theory related to all of the water rights of the Company, except the irrigation rights pertaining to the Platte Canon ranches, the irrigation rights which we assumed pertained to the Marston Lake and Platte Canon reservoir lands, and one or two smaller items of that sort, amounting in the aggregate to $93,000.

As to all of the rest of the water rights, as assumed that whatever actual cost had been involved in their acquisition, the company had been reimbursed therefor by charging it to operating expense or maintenance, and that as to the property right itself, the company held it as trustee for the city. If I should happen to be wrong in that solution of the question of law involved, there might be something to be added on account of water rights to the sum of the values which are specified in our Exhibit 54-19, but I would not undertake to say how much.

Under date of August 20, 1910, shortly prior to the bond election, the Utilities Commission put out a printed report, to which the names of myself and the other members were signed.

As of December 31, 1910, the commission published its annual report, which was printed. In that annual report, speaking of the

prior report issued on August 20, the commission stated: "Under date of August 20, for the purpose of informing the public as to its findings prior to the holding of the election on September 6th, the commission submitted to the public a preliminary report embodying a review of the official action of the commission to date." (Objected to. Objection overruled.)

The report of August 20, 1910, was made, published and promulgated by the commission just prior to the bond election for the purpose of informing those who were to vote on the bond question, so that the matters set forth in the report might be considered in their determination of what their action should be. In that report, and also in the annual report of December 31, 1910, we took up the appraisal made by the former board of appraisers which resulted in the valuation of $14,400,000. In our said reports we stated: "The total given by the board of appraisers for the physical plant is
793 $10,354,075; our estimate as given above is $5,405,000, or only about one half the amount estimated by the board of appraisers. Our reasons for this estimate are somewhat more fully shown in the report issued by our consulting engineer." (Objected to. Objection overruled. Exception.)

As to the item of water rights which had been separately appraised by the former board of appraisers, we stated in those reports in substance and effect that no valuation should be assigned to them because as a legal matter the company had no title to the water or the water rights, but those belonged to the consumer and not to the corporation. In our present valuation, except for the item of $93,000 incorporated in the land values and mentioned above, the theory in respect to the water rights was essentially that so expressed in our former report.

In our said reports of August 20, 1910, and December 31, 1910, in respect to the item of business and going concern value, which the former board of appraisers had valued as a separate item, we said: "It is undoubtedly true that some credit should be given to the business and going concern value, however, as defined in the report" (meaning the report of the board of appraisers), "as 'representing the added value of the plant because of its connections and business, and because the parts are united into one system and are tested and in successful use.'" I still entertain that view and think that some credit should be given to going concern value.

In our report of August 20, 1910, referring to the same subject of going value, we stated: "Assuming however, that a generous allowance should be made for the business value of the plant, and placing this value at $1,000,000, which in our opinion is at least twice the sum that should be used in making this estimate, we would have as a total $6,405,000 as the entire present value of the plant. These estimates we believe to be greater than actual conditions justify; it is credibly reported to this commission, in fact, that the original cost of the present plant was less than $5,000,000, and if that is the case, its present value, owing to depreciation, cannot be more at the present time than $4,000,000 at the very highest. If, in addition to this, we add, as is frequently done, ten per cent for the going concern value, we would have as the total present value of the plant $4,400,000."

We incorporated in our report of August 20, 1910 a report which had been made by Mr. Hiram Phillips, under date of August 1910, and made his report our own so far as it went. In that report of Mr. Hiram Phillips, so made a part of our report, it was stated:

794 "I recognize that the Company's plant, with all its imperfections has a positive value beyond its physical worth; it is a going concern."

In the conclusions which appear under that heading in the report of the commission of August 20, 1910, we stated: "The principal questions before this commission at the present time therefore are these: Was the amount of $7,000,000 in bonds offered to the water company sufficient to constitute a fair and reasonable remuneration for its plant; and, second, will the bond issue of $8,000,000, if sold or issued at par, as required by the Charter Amendment" (referring to section 264-*a* of the Charter), "furnish sufficient funds for the construction of a new plant, adequate for the supplying of the needs of this city at the present time? To both of those questions we give affirmative answers. We believe that the present plant of the Denver Union Water Company is worth less than $7,000,000 as a water supply to the city and county of Denver and its inhabitants, and we believe further that an adequate system, capable of furnishing a satisfactory supply of water to the city for the immediate future, can be constructed for $8,000,000. * * * In making these estimates, however, we have, we believe, erred, if at all, on the side of generosity to the water company, and we are convinced that the estimates we have made are conservative and safe. * * * We are confronted by the necessity of immediately constructing a new plant or permitting the water company to go on, entrenching itself more strongly and bringing the people of this city and county into political and financial bondage to a greater and greater extent from day to day and year to year. * * * The question then is resolved into this: Shall the people own or be owned? And to this question we believe there will be but one answer. Respectfully submitted, The Public Utilities Commission of the City and County of Denver, by Armour C. Anderson, President. Edwin Van Cise. A. Lincoln Fellows. Denver, Colorado, August 20, 1910."

By reason of my recent investigation, I have, as stated above, found it necessary to change my opinion in respect to the value of the water company's plant.

In our present valuation the lands which we have valued with water rights are those which according to our judgment and opinion were originally acquired and paid for by the company as lands with water rights. But the values which we have assigned to such lands represent what in our judgment is the prseent day irrigated land value, without regard to the original actual cost to the company.

795 Redirect examination:

The haste to which our committee of engineers was subjected in their work did not prevent them from making a complete investigation, except for those failures to re-calculate and correct which Mr. Van Diest has mentioned. . Inclemency of the weather and deep

snows prevented us from making additional excavations on the pipes and conduits which otherwise we had intended to do.

In incorporating into our valuation the values assigned by Armour C. Anderson and Carper to the ranch lands, we assumed that Anderson and Carper had carried into the value of the lands water right values at the rate of Sixty dollars per acre on the well irrigated land.

Recross-examination:

Our Committee, however, did cause to be made a considerable number of excavations along the lines of the conduits for the purpose of making an inspection of their physical condition. We made about forty such inspections. We had planned to make about one hundred, but we did succeed in making about forty. The excavations were made at points designated by the Committee and in the manner ordered by the Committee.

In determining the depreciation of the conduits and the other portions of the physical plant, we depreciated in accordance with the physical condition as we found it. With the exception of some portions of the distribution system, we found that all parts of the plant had been constructed since 1890, except a small portion of it which was constructed in 1889.

There were some parts of the distribution system which had been laid prior to 1890, concerning which the records do not disclose the exact year in which it was laid.

W. L. REYNOLDS, a witness for the defendants.

Direct examination by Mr. Nye:

Assistant engineer for the Public Utilities Commission; graduated from University of Colorado in 1909; has been connected with the Public Utilities Commission since April, 1914. Most of witness' experience has been in engineering work, and in 1911 was engineer for the Glenwood Light & Water Company; is now familiar with records pertaining to water and water rights in the state engineer's office. Witness prepared figures in Mr. Fellows' Exhibit 44; Fellows instructed witness to get all information from state engineer's
796 office and other places that would help to a definite conclusion in regard to Platte river; went through all the records, copied some, talked with division engineer and water commisioner of district 2, took all the information to Mr. Fellows and together worked up some preliminary tables to find out what the stream flow of the Platte would have been on an expanded table, and found that the year 1913 was a 113 per cent year, using a mean as a basis. Mr. Fellows determined the basis to be used. Witness' work was merely clerical. Took the basis determined by Mr. Fellows and did the arithmetic of it. Working with Mr. Fellows, it was determined that if a man owned a ditch in districts 2 or 8 and put in a crop, and did not get water in 1913, he would have little hope for water in putting in another crop. We would consider his demand a legitimate demand; anything past that would not be considered a demand, and 1913 was taken as a basis.

With that as a basis the tables were worked out. Witness is responsible for an error in table 4, page 3 of Exhibit 44, in the month of December, 1902; explains how it arose; was merely a matter of arithmetic. Witness has compared testimony of Anderson, Comstock, Bull, Field and Fellows, and has constructed a table of comparison.

Exhibit 47 marked for identification. That is the table of comparison of estimates of above-mentioned witnesses—just a mere tabulation of the testimony of the witnesses.

Further explains Exhibit 47. Where the available storage exceeded capacity of the reservoir, the witness substituted capacity of reservoir in certain columns; it was merely a computation.

The first note at the top of the exhibit was prepared by Mr. Fellows; the second note prepared by the witness.

Objection to the exhibit overruled.

Cross-examination by Mr. Dorsey:

Fellows prepared first three paragraphs on page 1 of Exhibit 47, and also the notes following the words: "Anderson" and "Comstock." The note following the word "Field" was prepared by Field, the note following the word "Bull" was prepared by Bull, and the note following the word "Fellows" was prepared by Mr. Fellows.

Witness prepared note on the water commissioner's reports on Exhibit 44; in arriving at stream flow in South Platte, certain basic figures were taken, and to that was added the amount that had been actually stored at Lake Cheesman, and the basic figures were taken
797 from records in the state engineer's office kept in loose-leaf notebooks, according to division; the loose leaves are the original records.

Cannot at this time give the mean flow expressed in second-feet that was taken for the months of April to October, inclusive. Witness explains way stream flow for January, 1902, was built up, as follows: On page 2, table 3, from the averages, we have January; the flow at Cheesman would furnish about 24 per cent of the flow at Platte Canon; the flow at Cheesman for January is given at 3,812 acre-feet, which would give 15,900 acre-feet as the flow at the canon, or a mean flow of 260 acre-feet for the month of January, 1902; had no actual records for that month.

We have actual records for January, 1910, showing 12,277 acre-feet for the canon, which would be a less average flow per second-foot. In preparing the records, witness talked with Mr. Field, state engineer, who was a witness in this case; Mr. Field only told witness where to find records. Mr. Fellows determined the basis on which the computations were based; that basis was, first, that 1913 was a fair year upon which to base an expected demand; second, that the Platte river under ordinary circumstances would take care of itself below Clear Creek; in other words, that the St. Vrain and the Big Thompson are needed to supply upper district 1. This had reference to the critical time of the irrigation season. It was assumed that none of the stream flow of all the side streams, running into district 2, except Clear Creek, were needed for the supply of district 1. This assumption was made as to the critical periods in the irrigation sea-

son. Other periods would take care of themselves. "Critical periods" means periods of heavy irrigation.

Witness was instructed by Mr. Fellows to use only Clear Creek and the side streams above as available to districts 2 and 8, and this assumption was applied uniformly; in tables 7 and 8, the inflow into districts 2 and 8 from tributaries and seepage was obtained from records in the state engineer's office, except where indicated by a star; those designated by a star were estimated and given to witness by Mr. Fellows; the figures appearing under the words "Cherry Creek and seepage" might have been designated by a star; they were estimated, but assumed to be uniform.

Whatever water commissioner's report said in respect to Cherry Creek would be incorporated. Does not know how the water commissioners estimate the seepage. Seepage measurements are taken down the Platte river from the mouth of the canon through to the state line. The water commissioners seem to be informed
798 about what the seepage was for the previous year, and they estimate it uniformly.

Seepage measurements ceased from 1909 until 1913, and in those years water commissioners took the 1909 figures, but witness checked it up with 1913. The first seepage measurement in 1913 was taken in October, and those would not be available for reports prior to that time; water commissioners' estimates compared favorably with the 1913 estimates. The measurement at the 16th Street bridge, which would practically include district 8, showed to be 70 feet return the total from the canon down to the end of district 2 showed 371 feet, or 301 feet in district 2.

Is not sure that measurements were made in 1909. Knows that a measurement was made in 1908. Water commissioner states that seepage varies from month to month; they do not make an actual determination. In the month of October, 1913, water commissioner's average seepage result was 293.9 second-feet, which compares favorably with the 1913 measurement of 301 second-feet. The range of water commissioner's estimates during the year was from 250 to 300 second-feet of seepage. The measurement of October, 1913, is given as a strictly seepage measurement, but probably covers more. It excluded tributary inflow, and included the sewers from Denver.

Table on page 7, Exhibit 44, being table 8, under the heading "Seepage" covers seepage and inflow from the Denver sewers. Witness treated sewage as seepage.

Does not know whether the sewage of Denver was included in the seepage measurements. Sewage would be considerable, and is of constant flow, particularly in the summer months; never measured it. Witness tabulated figures under Mr. Fellows' constant supervision, and in that way made table No. 9, which relates to the actual diversion in 1913—page 13 of Exhibit 44.

It was witness' intention to tabulate Last Chance ditch exactly as it occurs in water commissioner's report. In May and November, 1913, the witness took average flow reported for the Nevada ditch, and averaged it out over the full number of days in each month,

although the water commissioner reported that it flowed only for a part of the month; got the figures from the water commissioner's pocket notebook. There is only one statement in that note book concerning the Nevada ditch for the year; that was made at the end of the season, and reported an average flow of 55 second-feet, and a maximum flow of 55 second-feet; and the same condition existed as to the Last Chance ditch, but in addition it is reported that on two occasions the Last Chance was shut down. Re-
799 ferring to table 13 of Exhibit 54, got the figures from blue-print furnished by Mr. Hawes of The Denver Union Water Company. They are supposed to refer to actual diversions by the company in the year 1913 through the Platte Canon ditch. The High Line canal was included in the tabulation furnished by Mr. Hawes, but all the figures appearing in the table were in the tabulation given by Hawes, except the last column, which covers expansion to acre-feet.

Mr. Hawes' tabulation did not state whether the Platte Canon ditch diversions were for irrigation purposes or otherwise, and witness does not know.

Witness produces stream-flow records upon which the estimate of discharges appearing in table 4, page 3, of Exhibit 44, were made up, for the months of April to October, inclusive, 1902, expressed in acre-feet and in average second-feet, as follows: April, 15,507 acre-feet, average 261, second-feet; May, 11,103 acre-feet, average 181 second-feet; June, 7613 acre-feet, average 128 second-feet; July, 6248 acre-feet, average 85 second-feet; August 4979 acre-feet, average 81 second-feet; September 4861 acre-feet, average 82 second-feet; October 3792 acre-feet average 62 second-feet; November, 1081 acre-feet, average 50 second-feet. In arriving at the figures set down in table 4, Exhibit 44, there was added the quantities stored in Lake Cheesman each month, as shown by Exhibit 31, and whenever in any month an inflow into Cheesman was noted and no outflow was noted, the inflow was considered as actually stored and the addition to the figures was arrived at in that way. The notes on Exhibit 47 under the heading "Notes" were taken from the reports of the water commissioners—some from the weekly and some from the bi-weekly and some from the annual reports, or the field books. A note of precipitation record in the month of September was taken from precipitation records; the notes are not quotations from the water commissioners' reports, and witness tried not to introduce conclusions. Witness says notes selected from the water commissioners' reports were not selected to support the defendants' Witnesses as against the plaintiff's. When asked to give an instance where a note supported the plaintiff, referred to the year 1903, month of June.

Witness did not intend to cite notes merely to cut down high storage estimates.

Did not instance any note which would tend to show conditions favorable to storage. Wherever any such notes were available, they were omitted.

The average of the different witnesses shown in the comparative

tables Exhibit 47, are not for the same periods of years. A change in the periods would make a change in the results. Evapora-
800 tion was not deducted from any estimate in Exhibit 47.

Redirect examination by Mr. Nye:

Page 4, Exhibit 44, table 5, no change to be made in the year 1902. The data for the years 1900 to 1908 on that table are derived from loose leaf books in the state engineer's office. Since 1908 they have not been kept up to date; did not compare the loose leaves for that period with the water company's records.

Recross-examination by Mr. Dorsey:

The records of Cheesman flows kept by some representative of the water company and sent to the engineer.

W. L. REYNOLDS, A witness for defendants, recalled.

Direct examination by Mr. Nye:

Exhibit 56 shows representative ditches in lower Platte region, including Brantner, Fulton, Brighton and Farmers Independent, and the use which they made of water from the year 1908 to the year 1913, inclusive; it is shown by months and summarized by years. The solid line indicates the amount of water actually diverted each month; the broken line is uniform in all months, and shows the drafts during the months of May, June, July, August, September and October to yield 1½ acre-feet of water per acre; the drafts are figured on the following percentages: 15 per cent in May, 25 per cent in June, 25 per cent in July, 20 per cent in August, 10 per cent in September, and 5 per cent in October.

Illustrates page 6 of the exhibit. There were 3271 acres irrigated, 12,219 acre-feet were used, or 3.74 acre-feet per acre. These figures were taken from the State Engineer's records, and the actual amount of water diverted for each month is shown on this diagram as shown by the State Engineer's records. The acre-feet are figured from the second-feet per day, shown by those records; calculated that one second-foot for twenty-four hours would furnish 1.98 acre-feet.

The acre-feet supplied each month per acre is arrived at by dividing the total number of acre-feet supplied by the acres irrigated for that particular month. The last column of the table carries the percentages for particular months in reference to the total used for the year.

On page 10, the figures on the other tables are carried forward, so far as they are material, to show at the end of each month
801 the total amount of water, in acre-feet per acre, that has been used up to that time.

The theoretical supply for a single month does in one or two cases exceed the actual supply for the same month, but in all other cases the actual supply exceeds the theoretical supply. In the treatment of the actual supply, has commenced with the month when the diversions were actually made.

Further explanation of tables.

Continues explanation of tables.

Exhibit 56 offered in evidence. (Complainant objects thereto. Objection overruled.)

Cross-examination by Mr. Dorsey:

On page 6 and the following three pages the actual diversions of the various ditches are shown; the quantities diverted are taken from the water commissioner's reports. Those reports do not show whether the water actually taken through the headgate was actually applied to the lands.

FREDERIC W. TAYLOR, a witness for the defendants.

Direct examination by Mr. Nye:

Now devoting attention to his own farms and property; has always been interested in agriculture or horticulture work; professor of horticulture in University of Nebraska for eight years; had charge of extension work in Farmers Institute; spent 8 years with the Government exhibit in similar work at Omaha; chief of the department of agriculture and horticulture and irrigation and forestry at Omaha exposition, and in similar work at Buffalo exposition; was in charge of horticulture and agriculture at St. Louis previous to the opening of the exposition; visited Europe half a dozen times as special agent of the Department of Agriculture, studying conditions. Brought to this country the Kherson oats, from southern Russia; in service of Phillippine government, where was director of agriculture; owned land in Nebraska for twenty-five years.

In 1909 and 1910 was connected with large concern called Tri-State Land Company, having holdings of 32,000 acres of land and water rights on North Platte river. Spent about $200,000 building ditches and completed diversion dams across the North Platte river, and made arrangements for getting a sugar-beet factory; sold a million and a quarter dollars' worth of land; the company owned 32,000 acres; the ditch was completed with a capacity and had decrees for 80,000 acres; came to Colorado to live in the early part of 1907.

802 With J. G. White & Company on the Denver Reservoir Irrigation Company's scheme; made reports thereon for J. G. White & Company; then withdrew from Colorado and completed work in Nebraska and returned to Colorado.

Examined projects in all the irrigation states except California and Nevada; was appointed joint receiver of the Denver Reservoir Irrigation Company with Mr. Quigley; resigned to give way to Mr. Arthur Day; then went to Philippine Islands; is familiar in general way with the South Platte river and districts 2 and 8; knows roughly the boundaries of those two districts.

Has known the territory served by Brantner, Brighton, Fulton, Farmers Independent and Burlington ditches for a number of years; knows the English High Line ditch; owns four farms in Colorado,

two of which get supply from Standley lake and Marshall lake, other two from Farmers High Line; the latter takes its water from Clear Creek, near Golden. Two of the farms are 160 acres each, one is 95 and the other 45 acres; the two smaller ones are under the Farmers High Line and the two quarter sections are under Standley lake.

Within the last few weeks has made a number of examinations and studies of the situation on the Platte river from Denver twenty or thirty miles down; spent two or three days in the neighborhood of Fort Collins and Greeley, where most of the lands are watered from the Cache la Poudre, with the object of finding out what lands with water rights in various localities are worth, and what water itself sells for for irrigation purposes. In making investigation witness had Exhibit 40 before him.

Speaking from Exhibit 40, and comparing the Brantner supply with the assumed Cheesman supply, witness says that Brantner ditch gives an evener supply, less variation, than Lake Cheesman, and would say that Brantner was a better supply; the same answer as to the Fulton, Brighton and Farmers Independent. Thinks there is no difference between a reservoir supply and a direct supply, if it is only a question of being able to get from one the same amount of water as the other, on the same basis, during the same period. Knows of only two ditches along the Platte river that would be considered as needing a supplemental supply over the supply they now have, those are the English High Line and possibly the Burlington.

Brantner, Brighton, Fulton and Farmers Independent have all the water they have any use for, and from the charts in question, it would not appear that Cheesman lake could supply them
803 with water when they needed it, when their own rights could not supply it. Investigated the value of water rights under Brantner, Fulton, Brighton and Farmers Independent; started out with considerable knowledge of the conditions which he wished to prove or disprove; visited officers of the ditch to find out what their knowledge was, as to water used and regularity and price at which it was sold; went to state engineer's office, checked available data, and found it checked exactly with Exhibit 40. Made it a point to see actual users of water—farmers—under each ditch, and talked with them about their supply, regularity, price paid, etc. Talked with scores of people; information did not vary much; some apparent discrepancies were explained by methods of computation, or differences in form of expression; nearly always came out about right. Brantner ditch, one share evidences ownership of 11 inches; from state engineer's report, covering 11 years there was an average delivery of 3.3 acre-feet to each acre of land irrigated.

(Plaintiff's objection to witness' testimony as to value overruled.)

Brantner shares were worth $300; these shares give one inch for the acre; the market value for the acre would be $27.25, or $8.30 an acre-foot, on a basis of 3.3 acre-feet for the land irrigated. Fulton Ditch represented by shares, each share representing one inch of water for each one and three-fifths acres.

(Objection to testimony as to value of Fulton ditch shares over-

ruled.) Market value $65 to $75; price per acre, $42.80 per acre served, and $13 per acre-foot. Farmers Independent rights evidenced by shares, each share representing eight inches, one inch per acre; market value $300 a share, or $37.50 per acre, $9.17 per acre-foot, duty 4 acre-feet per acre; duty under Fulton ditch 3.3 acre-feet per acre.

Brighton ditch—not able to secure estimate of value. Farmers High Line, one of the ditches from which witness derives water, shares represent 10 inches for 30 to 40 acres; sells readily at $1,250 per share, which is its fair value; taking one share as sufficient for 35 acres, makes $35.60 per acre served; on the basis of actual delivery, as stated by the state engineer's reports, it would be $28.56 per acre-foot. Investigated ditches from the Cache la Poudre; examined Larimer and Weld County ditch, Larimer County canal, which is part of the Water Supply & Storage Company's organization; Larimer County Canal No. 2, commonly known as the Cache la Poudre, and Consolidated Hillsboro Ditch Company and the Home Supply ditch; and investigated these ditches in the same way as the ditches on the Platte. All these Cache la Poudre rights evidenced by shares.

804 Under the Larimer & Weld County ditch, a share represents 1.44 second-feet. (Evidence of market value objected to, overruled.) Market value $4,000. Users of these shares have two sources of supply: direct flow from the Larimer & Weld County ditch and storage from Terry lake or some other portion of the system. 1.44 second-feet used for each 160 acres, and two shares out of Terry Lake at $2,000 each, making his rights for the 160 acres cost $8,000, or $50 per acre, to cover both direct and storage supplies.

In that district it is usually considered that one share of direct-flow and two shares of storage is sufficient for 160 acres.

They grow a good deal of alfalfa, a considerable area of sugar beets, which take more water than ordinary cereal crops. With regard to Water Supply and Storage Company, when shares were originally issued, one share would be applied to 40 acres, but in practice one share is applied to 80 acres; the market value of $3,000 a share includes some stored water. This is sufficient supply to give an even supply throughout the season for agricultural service. Considering the share as sufficient for 80 acres, it gives a cost of $37.50 per acre.

Larimer County Canal No. 2, the shareholders get some direct water and some stored water; one share is used is serve 40 acres; market value, $2,000, $150 an acre; does not know the duty. Consolidated Hillsboro ditch, each share represents 50 inches, and is a water supply for 80 acres; market value, $1,800 per share; has sold as high as $3,000; present market value is $1,800.

There has been a decline in the demand. The market value, reduced to an acreage basis, would be $22.50 per acre; on basis of price of five years ago, it would be $37.50 per acre.

Home Supply ditch divided into rights; ten shares, constituting a right, are sufficient for 800 acres, but now each share considered sufficient for 80 acres; market value $4,400 per share, or $50 an

acre; character of crops raised under all the Cache la Poudre ditches about the same.

Witness not permitted to testify to income from his own ranches.

Witness not permitted to testify as to experience in selling water rights in Nebraska.

Witness had experience in selling water rights from Standley Lake system; started in 1907, selling a share of stock evidencing the ownership of 10 acre-feet of water; had several men working on it; sales went very slowly, so districts were organized and water sold in a lump to the districts, and payment taken in the form of district bonds; they were sold by bond companies, who called them
805 municipal bonds. Water rights were sold at $50 per acre-foot for the water, $500 per share of 10 acre-feet; could not say what amount was sold; it was very disappointing.

Not nearly all of the rights under the Standley lake have been sold. Assuming a reservoir such as Lake Cheesman, furnishing not less than 50,000 acre-feet per year for a period of ten years, and for four years less than 100 per cent, and taking into consideration knowledge of existing conditions along the valley of the Platte, witness thinks that the High Line ditch and the Burlington ditch would afford an opportunity to sell a supplemental supply, but not nearly all of the supply, and the rest would have to be sold for delivery into the general territory east of the Platte and northeast of Denver. Does not think anywhere near all of that water could be sold for supplemental supply.

There is plenty of land available to which it could be got within a safe distance—that is, a distance that it could be run without losing all of it, or a very large portion of it, from seepage. Does not think it could be sold in large quantities for cash. When asked to put a value on Lake Cheesman, witness says that he assumes that the farmers cannot afford to pay to exceed $50 per acre. Thinks that one and one-fourth acre-feet per acre is necessary, plus loss in transit; so that to make an accurate estimate, it would be necessary to know where the water was to be used, but assuming an average point of delivery under the English High Line and Burlington ditch, do not think loss in carriage would average less than 20 per cent, and estimates an acre-foot and a half of water for each acre to be served; then, cost of transportation must be considered, and the question of interest charge from now until the water could be old would have to be considered, but thinks it would be necessary to have an acre-foot and a half for $50, less cost of carriage, until it was actually sold, and the cost of transporting.

Assuming that the water is to be used on land under the High Line at the lower end, and the purchaser to pay carrying charges, would value the Cheesman water at $35 per acre-foot. There would probably be a loss of five to ten per cent, at least, in carrying the water from Cheesman lake down to the headgate of the Burlington ditch, and there is a considerable loss in the ditch itself; when you get 15 miles from the river there is sandy soil. Witness' estimates do not take into consideration cost of selling or evaporation. Cost of selling might be from ten to twenty per cent; would depend upon

conditions which are going to prevail. Does not think there is any existing demand which would not require a selling cost.

806 No irrigator can go to his headgate and draw water from a distant reservoir whenever he wants it; he must work in harmony with other users. There must be enough users at one time to make a decent run. If each one was supplied separate from the others, there would be a great loss in seepage. Water should be delivered in large quantities, of, say thirty to forty per cent of the capacity of the ditch in which it is run.

Witness also investigated the Burlington ditch, in which a share consists of four inches, each inch waters an acre; a share has a market value of $100; the duty of water is two acre-feet per acre; the value $12.50 per acre-foot or $25 an acre.

The Farmers High Line Company owns one reservoir, with a capacity of somewhere around 5,000 acre-feet, but nearly every user has his own reservoirs, which are mere distribution reservoirs for holding the supply as it is wanted. Company's storage is included in the $1,250 per share.

There is a supplemental supply known as the East Lake Water Company, which draws its water through the Farmers High Line, for about 1,000 acres; it is a separate organization.

Knows of Marston lake. Thinks the value for storage in that lake on a 40,000 acre-foot basis would be slightly but not much less than Cheesman lake. The water market is limited by the supply of land.

Thinks the land that could be irrigated by Lake Cheesman is divided up into small holdings of, on an average, not to exceed a section to the individual; there are some larger holdings of two or three thousand acres; more or less of the land is owned by people living in Denver, and a great deal owned by non-residents; such non-resident owners are not inclined to assume much of a burden to supply water to the land.

Cross-examination by Mr. Dorsey:

Witness 54 years of age; born in Nebraska, lived for 20 years in western Iowa; lived from 1887 to 1899 in Nebraska; became connected with the University of Nebraska in 1891; never engaged in anything but farming; father was a nurseryman, and witness followed that work until he was thirty; up to 1891 had no experience in irrigation; work in University was generally in promotion of interest in agriculture through the University agencies; stayed with the University until 1899; University work devoted in part to helping farmers in western part of the state, who depended on irrigation; visited Colorado during that time to study irrigation methods; in 1899 went to Buffalo.

Further details experience in connection with various Expositions, which continued until 1905.

807 Next went to Europe.

Had land in Missouri and Nebraska and central Illinois; has to drain Missouri land; investigated Denver Reservoir Irrigation Company for J. G. White in latter part of 1906; not sure of the exact

date, but spent ten days here. Made report to White at the end of the first trip; returned in May, 1907. At the time of first employment, company was incorporated; it had done nothing but have engineers' examinations and studies made; after witnesses' report, J. G. White & Company went into the Denver Reservoir Irrigation Company scheme; witness made a favorable report. J. G. White & Company expected to have all the engineering and construction work and to participate in the profits, if it should be profitable. They put in the only money that was put in during the early stages; they found the people who financed it.

Became manager in 1907; continued for two years; construction work was started and well under way at the expiration of that time.

Duties were particularly along the line of handling land, including purchase of the Denver Land Company, Marshall Lake, land that laid to the west side of the river, near the mountains; Marshall lake obtains water from South Boulder Creek; the Denver Reservoir Irrigation Company purchased it, including 20,000 acres. Witness' duty was to handle all this land and other land which was purchased—some out toward Hudson. The company operated some of the lands, and the rest are operated by the tenants.

Operated some land below Barr Lake, from the Barr Lake seepage. The Marshall lake and lands were acquired just before witness became manager. Hudson land acquired while witness was manager.

So far as these tracts were concerned, water was bought with the land.

At time witness left Denver Reservoir Irrigation Company in 1909, Standley lake had not had water; the whole system is not yet complete; after leaving the company, did some work for J. G. White & Company, in irrigation matters, some of them in Colorado, one or two in the neighborhood of Fort Morgan; made favorable report on the San Arroya project; it was a flood-water project; did not study it very carefully; did not study the water conditions so much as the land, but on other projects studied the land; does not disclaim any participation in examination of San Arroya water supply; worked out drainage area; has heard that the project was a complete collapse, and dismal failure, and a total loss all money invested, like many of them in Colorado.

808 While employed on Scotts Bluff project, made various reports; for two years was vice-president of the company owning the Scotts Bluff project; water supply came from the North Platte. At that time rights in the North Platte had not been thoroughly adjudicated, but were practically all appropriated; the ditch was the successor to a small ditch which had carried water for many years; water supply in the vicinity very well worked out.

The lands of the project lay a little above the Burlington railroad, Alliance branch; no reservoir connected with the system; some farmers had private reservoirs; part of witness' business was to sell the land.

Witness examined many projects for J. G. White & Company during that time; thinks one of these projects was located in the southern

part of the state, along the Arkansas river; don't think he examined any projects in Colorado; was appointed receiver for the Denver Reservoir Irrigation Company in June, 1910, and that continued a year; main canal of Standley lake, known as the Bull canal, was pretty well finished, and a considerable part of the laterals and a consideral part of the O'Brien canal, which takes water from the Platte, to Barr lake, and a considerable part of the construction of the extension of the Barr lake dam had been built during the receivership; the activities of the company were lessened on account of the receivership; considerable work was carried on for awhile, and then stopped almost entirely. During that time a deal was made with the Henrylyn district.

No offers were made to sell rights to individuals. The campaign for the sale of water to individuals was in the beginning of the year 1907, and at that time no work had been done; the project was simply a plan.

After retiring from the receivership, went to Philippine Islands; had something to do with the sale to the Henrylyn district during the receivership, and afterwards; remained in the Philippines a year and a half, a month of which time was spent on a visit to Denver; devoted that time to Denver Reservoir Irrigation affairs; no rights were sold during that time; left the Philippines January 15, 1914.

Went to state of Washington for J. G. White & Company; been in Denver since May, 1914, with the exception of about a month in the east; since that time has been devoting most of time to his farms in Colorado; bought one farm soon after coming here, another two years later, and two last year; operated them by tenants.

Denver Reservoir Irrigation Company owes him some money, and has been keeping track of its affairs; capital is very largely
809 tied up in irrigated lands, and is interested in the general subject.

When speaking of water supply of the South Platte, in the Denver Reservoir Irrigation Company's territory, had reference to irrigation district No. 2; fairly familiar with the Denver Reservoir Irrigation Company's supply, and had occasion to know a great deal of other ditches during seven years of living here; knows something about district No. 8; Denver Reservoir Irrigation Company takes water from Clear Creek, and right to take it was frequently dependent upon the way the Platte was flowing; the Church ditch was a part of the Denver Reservoir Irrigation company's system; at one time Denver Reservoir Irrigation Company was flirting with English High Line, with the view to purchase that, and the Antero; had an option on the English High Line, and all of its properties; did not result in a deal; has spent a good deal of time in inspecting High Line, and that is the only examination made of anything in district No. 8.

Witness has a general knowledge of conditions in district No. 8; Antero project is in district 23.

One of witness' farms can be irrigated from Marshall lake, or the Standley lake, through the Bull canal; water rights used to irrigate witness' farms under the Standley lake were not stock in the Denver Reservoir Irrigation Company; had other stock and exchanged it to

an irrigation district, and put the lands in the district and the water of the district from the Denver Reservoir Irrigation Company system, and shares in the Farmers Reservoir & Irrigation Company; the two farms under the Farmers High Line were recently acquired; bought the land and water together.

Witness studied the district between Denver and Fort Lupton several times; went through the country from here to Fort Collins, from Fort Collins to Greeley and back through into district 2; made three trips through that territory, and then studied the records of the state engineer's office; spent about ten days or two weeks in studying the South Platte river; trip to Fort Collins and Greeley was separate; spent two or three days at Fort Collins and Greeley; investigation made at request of counsel for defendants; object of the visit was to ascertain what land and water were worth, and what water was selling for; in every case tried to see, and actually did see, some of officers of various companies owning the water; saw people who actually used the water and owned the farms to which it was applied; found out what they had for given amount of land, and what it was worth, based on their belief as to the value of their own stock, or usually on sales that had been made; when hearing of sales, took pains
810 to verify them; not many recent sales had been made, either of land and water, or of water; sales of water alone were more rare than sales of land with water.

Systems visited are all relatively old; would go to banks in towns where the headquarters of the ditches were, to see what values would be placed upon ditch stock as collateral; did not base judgment on what the banker would loan, because bankers are conservative, but their statement of value of stock was usually near to values determined from inquiries elsewhere. One bank in Denver placed a value of $1,250 a share on Farmers High Line stock, and that was the value witness placed upon his own stock; value not based upon what other people said, but upon information considered reliable as to sales actually made; sales usually had been made at less than what stock was selling for five years ago; did not find many sales, but did not mean that no sales were found, or that there were not enough found to give a reasonable amount of information as to what it could be actually sold for; sales made at time similar to the present.

Sales of water alone are rare, and in quantities to supply an average of 80 acres; has not heard of large quantities of water being sold recently, and would expect trouble in selling large quantities; the fact is, not much is changing hands.

Witness had with him Mr. Bull's Exhibit 40, but paid special attention to the use of the water and to what users said about the sufficiency of the supply during recent years.

Witness made a comparison of the assumed Lake Cheesman supply and certain ditch supplies in district 2, based upon Mr. Bull's Exhibit 40, and stated in direct-examination that worth of water right was to be determined by consideration of whether or not the users thereof had sufficient water in quantity, and whether they had it when they needed it. Both of these factors are of vital importance. Plentiful supply in times of lack of need is not as important as plen-

tiful supply at time of need; observed that Mr. Bull's diagram purports to compare with assumed Lake Cheesman supply certain ditch supplies, all on the basis of acre-feet furnished by each ditch compared in each year, and not by quantities furnished in each month; it is likewise true of his tables.

It is quite useless to consider ditch supply without knowing as to distribution of it throughout the irrigation season; it is certainly true that no irrigation supply of water would be a good supply that does not furnish what is wanted when wanted; that is not one of the marked distinctions between storage supply and direct supply, unless it is assumed that the stream is irregular to extent that it cannot supply the water as regularly as the stored supply. There is
811 no difference to farmer in availability or value between water from reservoir or water from streams; just a question of whether either source yields what he wants when he wants it. It is true that any source of supply must be regular or available at the right time, and if a reservoir provided a supply which is more regular, and from which you could get water more regularly when you wanted it than the direct flow, it would be more valuable.

One attempting to draw a conclusion just from Mr. Bull's chart, in Exhibit 40, would be without information as to the supply from month to month. Witness, in drawing his conclusion, applied his knowledge as to the regularity of the supply with reference to the particular ditches compared; did not base his judgment entirely on Mr. Bull's chart; that chart would be insufficient either as to the reservoir or direct supply; not be fair to either of them to draw conclusions without other knowledge as to the actual facts which exist as to when the supply is available.

The South Platte river is extremely variable during the irrigation season. It is also true that the stream flow is seldom low enough but what certain old rights get their water. It is true that for irrigation purposes water is to be applied to the lands in different quantities in different months, depending on many elements—natural rainfall during the month, condition of the soil at the beginning of the month, and need for the coming month, and the crops that are growing, and the necessities. The quantity of water that can be taken through the ditch is a constant one. It is necessary to have a ditch capacity which will supply the highest need for any time during the season. All ditches are constructed on the basis of carrying a certain number of second-feet, in proportion to the acreage. The needs vary from time to time and are controlled by the conditions stated: whether you would need an appropriation and ditch capacity of more second-feet of direct flow than you would have to have of stored water to irrigate the same number of acres, would depend entirely upon the regularity of the stream flow; if the source of supply is regular, would not have to take out and attempt to use any more water than was wanted.

If running stream is level, and one can get water from it when wanted, does not see how it differs from any other source of supply; it would be necessary to have an appropriation which entitles the

user to divert at a rate which will supply the water needed at the time of greatest need.

With a storage right, water could accumulate in a reservoir when not needed, but with an unfailing direct flow it would not be necessary to accumulate it. There is no right to withdraw water except for beneficial use. The judgment of water commissioner is
812 followed on that. When a ditch has no beneficial use, it is shut off. If water is stored in reservoir, it can, of course, be used when wanted.

Whichever source of supply furnishes the more regular supply of water and the quantity that you need at the proper times, is the better supply.

Witness' opinion as to the relative value of the supply from the Brantner ditch, Fulton, Brighton and Farmers Independent ditches, respectively, as compared with the assumed Lake Cheesman supply, was not only on the chart of Mr. Bull, but upon the information which the witness had as to the supply in particular months. That information was acquired in the same way as the information as to the market price, and by examining the state engineer's reports, particularly by knowledge and information as to the actual service of the ditches; less upon inquiry in the engineer's office and more upon knowledge acquired on the ground. Comparison between the ditches and Lake Cheesman was based on the assumption that they were all to be used as a total source of supply; was not considering Cheesman as a supplemental supply.

A market exists for storage water as a supplemental supply; when arriving at the value as a supplemental supply, must consider possibility of its being sold within comparatively short time. Statements made in this case as to value of Lake Cheesman water are on the assumption that the interest and overhead charges would not be very considerable; does not believe it can be sold within a comparatively short time, but is assuming that, and on that assumption assigned the market prices which exist at the present time. Thinks it could have been sold more readily three or four years ago, and very likely at higher prices; thinks they will return; hopes they will be here in five years; does not consider present-day conditions and prices normal; they are either below normal today, or they were above normal a few years ago; perhaps truth is somewheres between; judgment is that the present depression is abnormal; does not think there is a market today to absorb all of Cheesman supply as a supplemental supply; cannot see where either in normal or good times anywhere near all of it could be placed as a supplemental supply; has in mind ditches like the English High Line and the Burlington, which have not now sufficient supply that will enable them to carry through the ordinary farm crops; they may carry through cereals, but a large acreage of alfalfa under them could not be safe; had in mind ditches of that character, which are short now of water to finish off their irrigation seasons; does not recall any other ditches of any importance where that is true.

813 Would confine his judgment to territory between Denver and Fort Lupton; does not know with regard to the supply of

water beyond Greeley, or hardly as far as Greeley; means to include ditches having a sufficient supply for the early part of the season, but that would need water for additional supply during the latter part.

Witness thinks the contracts under the High Line call for 28,000 acres; does not know that the water commissioner's report for 1913 states that there are 90,000 acres physically irrigable from the High Line; as to that ditch, would assume there will be a supplemental supply for 30,000 acres that are drawing water now, and that that amount cannot be materially increased for a yearly supply, and beyond that it would be necessary for them to get another supply.

It has been witness' understanding that English High Line has outstanding contracts which would completely exhaust its present ability to supply, and under that the farmers do not get a sufficient supply.

In referring to Burlington ditch, meant that ditch as extended; it could use water as supplemental to the Barr Lake supply; did not include the O'Brien canal; that is a part of the Standley Lake system; it might receive supplemental water from Cheesman lake, but the Standley lake system has a large amount of unsold water; did not consider the Henrylyn district for the same reason; thinks there is water in the Standley lake system for the Henrylyn district.

A right in the Denver Reservoir Irrigation Company entitles the holder to share in whatever water is furnished for the system, and the right is reserved to sell additional rights up to what is estimated to be working capacity. Purchasers buy so many acre-feet and pro rate on the supply in the reservoir; number of acre-feet that may be finally sold is limited in the contract. The Henrylyn has not an adequate supply; it buys fraction of an acre-foot, and believes they will be in the market to buy water when they find it out; it is a question whether they would buy from the Standley system or some other system, and if from any other system, whether Standley system would permit its delivery.

Henrylyn district is reached by the O'Brien canal and owns proportionate share of the water.

There is a shortage in the Henrylyn district, and when they are in the market to buy, it would be a competition between Cheesman and Standley.

Witness stated that Brantner, Brighton, Fulton and Farmers Independent had all the water that they needed, and believes it to be true. The water that they draw from the stream is not limited
814 by the amount that has been drawn, they can come back and get more, whereas, in the case of a reservoir, they get no more. Shortages occur in the supply of these ditches. Witness says these ditch supplies are better than Lake Cheesman, and bases conclusion upon the fact that during any given season they get a greater supply and are short for only comparatively short periods, which correspond more or less to the periods of shortage from Cheesman; they would have to work with others and perhaps wait a week before ordering water, and then wait two days for it to get down. This year they have fine crops, requiring a great deal of irrigation. The shortages do not seem to occur over such periods of time as to interfere with first-class

irrigation, which is the important point; thinks it is fair to say that these ditch supplies are better than Cheesman, if one assumes that the Cheesman right would be an acre-foot and a half for each acre served, and when that amount is drawn no more can be drawn; means if 50,000 acre-feet were sold and there came a year when the total delivery for the year was thirty or forty, it would reduce for that year the amount which would be delivered.

Examining the chart in Exhibit 40, attention of witness is called to the fact that there are no records for the year 1902 in connection with the Brantner ditch, but knows that stream flows were extremely low and year excessively dry; does not know what supply the Brantner got; attention is called to fact that Lake Cheesman gave over 100 per cent supply that year.

Witness went over the territory covered by Brantner ditch; interviewed persons there; was told that on share of stock in the Brantner represented 11 inches; has not the names of the people interviewed; don't know how many shares there are in the Brantner ditch; does not know whether 11 inches per share is determined by the total decreed priority by the number of outstanding shares; cannot tell the corporate name of the ditch company; does not know whether the original Brantner Ditch Company was a corporation; does not know that it was originally an association of nine persons; never heard that; does not know that the present company is the New Brantner Extension Ditch Company; does not know that outstanding stock is in the New Brantner Ditch Company, nor the number of shares; does not know that the only rights the company has are for water taken under the ditch priority after supplying the needs of the original nine persons; knew it was true of some other ditches. State engineer's report states the amount of water run; they are tabulated in Mr. Bull's Exhibit 40. The engineer's records would include the entire acreage, not only that irrigated by the water of the
815 company, but the water belonging to the old association. If that were true, the water diverted would not represent the water allot-able to the shares of the company; acquired knowledge of the market value of the Brantner ditch shares by conversation with people drawing water and using it; has no personal knowledge of any sale; cannot give the name of any one who informed him of sales; simply gave witness' estimates of market value; don't think that under Brantner ditch any sales have been made recently, especially of ditch stock, separate and apart from the land; none for sale; all applied to the land, and can only be acquired by purchase of land. The ditch has an old priority. Developments have been brought to completion. It would be very unusual to find any stock for sale. It often occurs that the same amount of water can be applied to more land, and that the owner would sell a portion of his water, having more than he needed for his own land. Sales would be limited for lands lying under the ditch, and when all the land under the ditch is covered, the opportunity to sell the water separately is gone, and the market is very much limited.

On direct testimony witness stated that each Brantner share had a market value of $300, represented 11 inches, and divided 300 by 11

to get the value per acre. The information that one inch served an acre was acquired in the same way as the other information regarding the ditch; does not know that the Brantner share does not cover any definite number of inches, but merely a right to participate in the water which can be diverted after the original nine persons have been supplied. The one inch per acre cannot be far from right, when you figure the number of acres and the amount in acre-feet which was diverted for the land; has no other means of arriving at $27.25 per acre than a consideration of the fact that one inch of water is used for each acre; that the ditch draws a specific number of acre-feet, according to the reports of the state engineer; information was that one share waters eleven acres, and it would not make any difference whether there was one inch to the acre or not; the acre price would be the same; got the price per acre-foot by dividing $27.25 by 3.3 acre-feet, which is the amount shown from the water commissioner's reports; doubts whether all the water diverted through the Brantner headgate is applied to the lands under the ditch; knows that water is taken into the head of the Brantner ditch, carried away and turned back into the stream; has no record to show what was spilled out at the lower end; probably much that was spilled out was returned as seepage—that is, water that was applied to the land and flowed back into the ditch. Knows in a general way that water is passed into the ditch and out through the lower end; has not seen the ditch, but believes there is a gate through which the
816 water may be passed out before the lower end of the ditch is reached; unfortunate that in many of these ditches it is impossible to get the actual facts of the water applied on the land. The higher the actual duty of the water, the higher the price per acre-foot.

Witness does not want to be understood as assuming that the price per acre-foot as worked out is correct as to the fair price of an acre-foot of water. To get a fair value, it would be necessary to know what amount of water was actually used. The Brantner decrees aggregate 111.18 second-feet, shown by Exhibit 40; assumes 4,130 acres as the acreage irrigated under the Brantner.

Witness figures to determine length of time the decreed quantity must run to furnish one inch to the acre on the acreage under the Brantner ditch; perhaps all of the decreed priorities must be made use of. All the acreage under the Brantner ditch is practically exhausted, and a purchaser of water under that ditch would have no use for it if he had no land to apply it to. If there is absolutely no sale, can only reach an opinion as to the value of the water rights by comparing them with the water rights sold for equally good land in other districts where there is equally good land and less water; conclusion as to market price on Brantner ditch arrived at from actual sales; generally, the land is all covered; that is true of several ditches in district 2.

Exhibit 44 introduced by Mr. Fellows shows available acreage under Brantner ditch is 5,000; total irrigated in 1913 was 4,560 acres. Mr. Bull's Exhibit 40 shows 4,870 acres irrigated under Brantner in 1911. Practically the only use a purchaser of Brantner water could make of it would be by changing the point of diversion;

if it could be transferred at a profit that would make a market for it; market price would be determined from value of similar water under other ditches. This information obtainable under the Fulton ditch was that one share represented one inch; does not know whether the Fulton is an incorporated company, nor how many shares there are.

It is impossible to state definitely how much each share represents in point of inches of water, except from the statements of owners; knows nothing about it except the statement that share constitutes one inch. One inch will supply one and three-fifths acres. The Brantner has an earlier right and requires more water; acquired knowledge of value of Fulton rights in the same way as Brantner rights; not advised of any actual sales of Fulton stock; took estimates of owners and assumed that was high enough; interviewed perhaps a half dozen users of water and people at the local banks; cannot give the name of a single individual advising value of Fulton sales.

817 Witness repeats method of arriving at the acre-foot value of Fulton water; that value is too low because they use more than is necessary. Does not think too low a price for the shares materially modified the figures, and if correction was made for water taken into the ditch and wasted, that would make a higher value; does not know about outstanding indebtedness of the Fulton. The outstanding debts would have to be pro rated to arrive at fair market price; would not be surprised to know that the Fulton is in the market for supplemental supply. The Brantner and Fulton are near together.

The fact that witness gets $27.25 value for certain Brantner rights and 42.80 for similar Fulton rights is due to fact that the Brantner ditch waters land near the river and takes a larger supply of water than that acquired by the Fulton. Witness is aware that Mr. Bull's Exhibit 40 shows the duty of water in acre-feet is exactly the same in both ditches; it is hard to account for it; controlled to a great extent by local conditions. Witness thinks that all of the land under a certain ditch under irrigation is very important. That is true in the case of the Fulton ditch to a less extent than the Brantner.

Exhibit 44, page 10, table 12, shows that in 1913 there were 10,715 acres irrigated under the Fulton ditch, and 11,000 is the total acreage irrigable.

Further reference to Exhibit 40 shows practical exhaustion of Fulton acreage; does not know whether Farmers Independent ditch is operated by a corporation, or how many shares there are.

Took somebody's statement for fact that each share in Farmers Independent ditch represented eight inches; does not recollect whose statement it was; conclusion that one inch was required for each acre arrived at in same way; interviewed not less than two or three; acquired information as to market value in same way; information as to market value derived from owners; assumed that they knew; owners would often refer to the fact that they bought them for very little; possibly many of them acquired forty years ago and paid for in work, so that they cost just what the labor cost; does not know what one share represents further than statements of owners. Witness explains how he arrived at a value of $9.17 per acre under this

ditch. It is not strange that this amount varies from the Brantner and Fulton values. If the duty expressed in Mr. Bull's exhibit was too low for this ditch, the acre value of the water was too low. If the duty for water for either 1912 or 1913 had been taken, the price would have been proportionately raised. The value arrived at does not represent witness' judgment of value; probably affected
818 and depreciated by the circumstances affecting the other ditches mentioned; did not investigate the question of indebtedness of the Farmers Independent Ditch Company; that will have to be taken into consideration.

As shown by Mr. Bull's Exhibit 40, the actual ditch capacity is 150 second-feet; the decree is 520 second-feet. The first two out of the three decreed priorities are all that this ditch will take care of. Reference to Mr. Bull's Exhibit 44 shows that this ditch cannot at all times secure the quantity decreed to it under the first two priorities.

The supply of this ditch for the year 1913 was such that it would not yield water for late irrigation. When shown the performance of the Brantner ditch in Exhibit 44, table No. 11, which showed fifty per cent more in June than in September or May, less in July, less in August than in June, witness states that the desirability of such a rate of supply would depend upon crops that are growing, and just what use one wishes to make of it. There is sufficient water in August and September to supply a fair proportion of the acreage and the crops needing water. All cereals would have been harvested before that time.

Referring to the Fulton ditch, table shows that large part of the supply is furnished in the month of June; that it falls off in July and August; thinks that is a satisfactory rate. Cereals would be finished by that time. Sugar beets, potatoes, and crops of that sort, or alfalfa, would need an evener and larger supply, but farmer is not apt to have more than half of his farm in crops which require water after the first day of July.

Whether the Cheesman supply would be better would depend upon the amount he was entitled to receive. If a farmer had bought only an acre-foot for each acre of land, he might not be able to get a better distribution than that shown by the ditches; he would have to order it when others were using it; will not modify views as to the superiority of ditch supply. It is a mistaken impression to think that water can be gotten from a reservoir exactly when needed. The supply is limited by the quantity purchased, and can only be gotten when other people are running.

Witness put no price on rights in Brighton ditch, because could get no market value on the shares, water not being sold separate from the land; could find no cases of sales. As to other ditches mentioned, would say there had been water sold or offered for sale under them; such sales did not cover any considerable quantity, usually not exceeding 80 acres.

819 Farmers High Line Canal and Reservoir Company takes water from Clear Creek; one share represents ten inches; cannot tell how many shares there are; reached that conclusion by knowledge of his own ownership; cannot say what the shares represent,

except that it is treated on the basis of one share, representing ten inches of water.

Witness owns one share for each 35 acres irrigated; that is his only source of supply; has some small reservoirs in which that water is conserved; this equals one inch for each three and one-half acres; higher duty of water than in case of other ditches; has had shares offered at $1,250 per share within three or six months.

There are no considerable number of shares for sale apart from the land. Shares entitle owners to participate in small reservoir capacity. Witness bought his land, water right and reservoir together, and thinks that deducting the cost of improvements, including the reservoirs and the price of the land, the shares cost less than $1,250. Perhaps half of the users under the system have private reservoirs; should not want to depend on one share to irrigate 35 acres for the growing of beets and potatoes, and crops of that sort. To get the very best service out of the water the private reservoirs are desirable.

Company has outstanding indebtedness; does not know the amount. Whether the indebtedness should be added to the market price of the shares, in order to get the value of the water, would depend upon whether there was any treasury stock to be sold to pay indebtedness; does not know whether there is any treasury stock in the company; has three small reservoirs on farms, aggregating 140 acres; thinks it cost $500 to construct the reservoirs; would be about $3.50 an acre. Arrived at $28.56 per acre-foot on basis as explained in direct testimony; is well operated ditch; the needed amount is less and the water is thoroughly conserved and used.

There is plenty of land that the canal can reach, but assuming that stock had been issued, representing all of the right to divert and use the water, then the amount not in use would represent the amount which could be put into use. There is a great deal of land on which water could be applied; it would require additional construction. The lower end of the ditch reaches the Brantner ditch territory, but the unwatered lands it is proposed to serve by the Standley lake system.

Difference in value between the Brantner value of $300 for 11 inches and the Farmers High Line of $1,250 for 10 inches is hard to account for. Two parcels of land equally well located are sometimes of different market value. The difference in value be-
820 tween these two water rights may depend on the fact that the lands under the Brantner and other ditches are pretty well served, and there is a great difference in the two areas of land; thinks the strongest reason for the difference is that under the Brantner and Fulton all the land that can be reached by the ditch is under irrigation.

There has been considerable reservoir development in the Poudre district; has not valued stored water there separate from other supply. The Cache la Poudre systems testified to by witness are supplied by combination of direct rights and reservoir rights; testimony here covered market price of the combination of rights; in one or two cases they were separated. In Larimer & Weld canal system

one share represents 1.44 second-feet; that allows participation in direct flow entirely; does not know whether Larimer & Weld system is a corporation. Was informed by the superintendent of the ditch and others that one share represented 1.44 second-feet; assumes that that is reached by dividing total quantity specified in the decrees by the number of shares; does not mean that each share is entitled to constant flow of 1.44 scond-feet, and gets it, but means that each share is entitled to a ratable proportion of the entire product of the direct-flow rights of that company, not to exceed a rate of flow of 1.44 second-feet; market value $4000 per share; was told that there was delivered annually under direct-flow rights 105 acre-feet per share; superintendent said during the first twenty days of irrigation season there was a half supply; next twenty days a full supply, and for the remaining ten days of the period of fifty days got a half supply; probably began May 1 to 15; run would end about July 1. Considered a fair supply without supplement for cereal crops; must have an additional supply for alfalfa and sugar beets; that comes from storage. Reservoir water is worth $2000 per share, or $4000 for 160 acres; does not know whether Terry Lake is owned by separate corporation; does not know anything about the capacity of the reservoir or of the number of shares sold; only knows that this reservoir supply is used as a supplement after the direct supply has been run.

The 1.44 second-feet of the Larimer & Weld canal is supposed to furnish sufficient supply for 160 acres during the fifty-day run.

If witness should be mistaken, and the Larimer & Weld canal right, calling for 1.44 second-feet, is a right for 80 acres, it would raise the acre value. The direct-flow right gives 105 acre-feet for each share; got this information from the superintendent; does not know what the duty of the combined supply is.

821 Various farmers believe the duty in the Cache la Poudre district to be from 1¼ to 1½ acre-feet for each acre served; did not study that phase of it. The water-right value under the system is approximately $50; cannot tell what is the value per acre-foot of the storage water; reservoir rights purchased and paid for separately and represented by different stock; does not know whether they carry any proportionate cost of these ditches through which the water is carried.

The direct-flow prices do not necessarily cover the distribution ditches, if both direct-flow and storage rights are bought jointly; presumes the reservoir adjuncts were created after the direct-flow ditches were built. It is quite impossible to grow beets, potatoes, and those crops, without a late supply of water; such crops are raised successfully in the Cache la Poudre district, about Fort Collins and Greeley; they raise a considerable acreage of crops of that character under certain parts of the High Line, and all along the Platte.

In view of the high duty of water in the Poudre country, witness accounts for the low duty of water in other districts mentioned by the fact that land in the latter districts requires more, and the conditions covered by other answers; possibly unnecessary diversions and drawing of more water than is needed. Water Supply and

Storage Company's system, one share sufficient for 80 acres, originally intended for 40 acres, supplemented with storage facilities; has no knowledge as to its priority; did not inquire into it; only knows that it is said that in conjunction with the direct supply, it is sufficient; does not know character, size or yield of the reservoir, or how many shares are outstanding, or what one share represents, by process of arithmetic, nor what portion of supply is furnished from storage; does not know acre-foot amount supplied from either source; ascertained market price to be $300 each, from inquiry; did not find any considerable changes in ownership; did not attempt to find out the number of shares that had been sold; knows nothing about outstanding indebtedness; that must be considered.

Larimer County canal No. 2, commonly known as the Cache la Poudre canal; cannot tell where the intake is; got the information concerning it from Mr. Nelson, superintendent of the Greeley Water Works; one share sufficient for 40 acres; shares represent both direct flow and storage; is not able to state of what the storage supply consists; storage water used at the close of the season; cannot say how much total supply is furnished by the direct supply, and how much by storage; does not know duty under the system; cannot
822 state what is paid for storage and what for direct flow. For combined supply the price is $50 for each acre served.

Information not confined to one source only; headgate is about half mile from the town of La Porte; does not know where the reservoirs are located; lands irrigated are in the neighborhood of La Porte.

Witness crossed canal and drove over the lands. The information concerning Consolidated Hillsboro ditch was obtained at Greeley; did not see the ditch or any land lying under it; does not know where it take- its water; all witness knows is what someone told him at Greeley; was told one share of stock represents 50 inches; does not know how informant arrived at that conclusion; was informed that one share of stock furnished supply for 80 acres; information is that it diverts water from the Big Thompson, being decree No. 1; thinks it is purely a direct flow; by reason of its early priority, sufficient to furnish a supply for entire season; means the first decree out of the Big Thompson; ditch has later decrees, but does not know the amount; does not know the date of the earliest decree.

Does not know how many shares of stock there are in the ditch, or what its decreed priorities are; has no knowledge or information upon which to base independent judgment as to whether or not the purchase of one share was enough to adequately irrigate 80 acres; does not know the duty of water under system; market value at present time, $1800; information derived from same source; does not know how many shares were sold at that price; knows of no specific sales; has sold as high as $3000 per share; knows nothing beyond what he learned from his informant; knows nothing of the circumstances of the sales.

On $3000 basis, acreage price would be $37.50 instead of $22.50; knows practically nothing about the Home Supply ditch; has no

knowledge about reservoir supply for it; former computation was wrong. A right consisting of ten shares is sufficient for 80 acres; cost per acre would be $50; wishes to so correct direct testimony; never saw the ditch or the land under it; information from P. W. Allen, of Greeley; does not know how much water is furnished to the owner of ten shares, or whether it is direct or measured supply; knows nothing of the date of the decrees or the quantity of decrees, or the duty under the ditch, or whether it takes water from the Cache la Poudre or is located in district 3.

Did not investigate the duty of water in the Cache la Poudre district; did not investigate what proportion of supply came
823 from reservoirs and what was direct; did not learn the market price per acre-foot:

Witness returns to Burlington ditch; does not know how many shares there are in the total of its decreed priorities.

All sales of water, of all kinds, under all provisions, are subject to the proviso that the stock participates, if the source of supply is available; Burlington decree is known as a late decree; the ditch's supply is uncertain and irregular in quantity; is ditch of considerable variation; knows this from observation; very unsatisfactory supply; marked value of Burlington stock, $100 per share; placed that value on the shares because ten shares were offered to witness at that price; does not know whether there is a considerable amount for sale; thinks the only available data would fix the value of the stock; knows of no considerable sales.

It was the general opinion of those who used the water that that was the value of the shares; talked with half a dozen; witness explains method of arriving at acre value of the water. The duty of two acre-feet per acre was arrived at by data from water commissioners, which includes all diversions; did not know that these diversions included storage diversions.

Witness was referred to his testimony on page 2895 to the effect that his investigations under the Burlington were confined to lands this side of the Oasis reservoir. In explanation of it, witness said: "The investigations could not have included that; as a matter of fact, I did not know whether the general average of 2.2 feet included the storage supply and also included the water which was delivered beyond Barr lake, or whether they would get the benefit of the storage supply; I suppose the figures do relate to the entire district, the entire area under the ditch, but my own immediate investigation and statement at that time referred to the examination which I recently made."

If storage diversions were included in the basis for computation of the duty of water, correction should be made, and the cost per acre would be correspondingly greater; does not think this value on Burlington water should be used as a criterion. The Burlington ditch is better in some years and the Cheesman supply is better in others.

Does not think that the Burlington ditch has a better supply than Lake Cheesman; has stated that the Brantner and Brighton are better than the Cheesman, and is not sure but what the same is true of the

Fulton. To determine that, it was necessary to know what the ditches were getting from month to month, and witness did this largely from observation and by study from Mr. Bull's tables
824 in another exhibit. If at any time, a ditch having a junior right was drawing water, and the Brantner was not drawing all to which it was entitled by its decrees, then it would be assumed that the Brantner was getting all it wanted.

In order to say that a ditch supply is better than the Cheesman supply, it must appear that the ditch user can get all the water he needs in any particular month of the irrigation season, and that he cannot do so from the Cheesman supply. There are years in which the chart would seem to indicate that a user could not get what he needed from Cheesman on the assumed draft of 60,000 acre-feet: that would be because of shortage of supply in particular years.

The ditch systems described in the Poudre district are completely developed; does not know whether the lands in that district are all supplied or whether there is any restriction of the market for the water. If all the acres physically under the ditches are now supplied with water, it would limit the amount to which additional water could be sold and practically destroy any market, unless for purposes of transfer. Transfer is exceedingly doubtful and very expensive. These considerations would depress the market price of such shares; would not apply the acre-foot value applied to the ditches in district 2 to the Cheesman supply; would not use it as a definite guide; it would be a factor. The accuracy of conclusions arrived at in respect to the ditches is subject to various considerations; they are all direct-flow ditches.

As to the Poudre systems, did not ascertain the value per acre-foot or the duty of water; did not attempt to arrive at a guide as to cost or value of water per acre-foot, particularly as to the cost or value of stored water per acre-foot; only experience in Colorado and in vicinity of Denver in respect to actual sale of stored water is in connection with the Denver Reservoir Irrigation Company: had something to do with first effort to sell D. R. I. water to farmers, at a time when system had not been constructed.

Standley lake is the backbone of the Denver Reservoir Irrigation system; cannot say how many shares were offered for sale in 1907 to 1909. The amount was increased from time to time with the addition of other systems. There was always a limit to the amount of capacity which could be sold.

There was always an agreement as to the extent to which the stock could be diluted. There were a number of sales made in 1907. As the capacity was increased, and more systems added, a greater amount of stock could be sold. Original purchasers expected to get
825 their water supply from system as a whole. Work was being done on Standley, but was not completed.

Purchasers at that time would have to rely for a supply upon a system, an important part of which was merely in process of construction, and would be expected to pay for his stock or mortgage property to secure the purchase price. The limit of sales that could be made was fixed; experience has been that while the work is being

actually prosecuted and laborers are building ditches and dams, you can get as good results on sales as you can later, when there is not that live phase to appeal to the purchaser.

Witness would prefer to buy from a completed system, but as a matter of fact, in selling, the early stage of construction is a psychological time to sell; does not think that a farmer buying under those conditions is using good judgment, but is frequently done.

Denver Reservoir Irrigation shares were offered in 1907 and 1908 at $500 per share, representing right to 10 acre-feet, or that proportion of the water actually stored which ten acre-feet bore to the entire capacity. There was no guarantee that 10 acre-feet would be secured; it was represented that in an average year each share would get ten acre-feet; that occasionally it would be below, and at other times higher. The shares were limited to ten acre-feet, but the representation was that the remaining unsold water would be distributed so far as safety would permit to those holding shares. Does not recollect how many shares were sold; does not know what the total yield was to be; a very good efficiency was assumed; that would in no year fall enough below to be outside of good business. The efficiency of 90 to 100 per cent is good, provided there are not any or a very few years when it gets below 60.

Witness was for two years manager of the Denver Reservoir Irrigation Company; does not know what efficiency was calculated; was responsible for care of all the lands and the distribution of water when available. There was a general manager responsible for the other phases. The sale of water rights was not directly under witness' control; was a member of the executive committee, in which all these matters were discussed, but actual carrying out of the sales did not come under his jurisdiction.

Does not know what representations as to efficiency were made. Sale to the Henrylyn was made in 1910 and 1911. The completion of that sale was made at the close of witness' receivership; recollects 5,000 shares, representing 10 acre-feet each, were sold to the Henrylyn; cannot say how much of that would be supplied by
826 direct flow and how much by storage; Standley lake water taken from Clear Creek, fed by the Croke canal; it is a rather late priority, later than Cheesman; Standley is not decreed; cannot give the total storage capacity of the Standley system; understanding is that it is believed to be substantially 60,000 acre-feet for Standley lake; this is larger than Milton lake. The original Barr lake does not belong to Standley system; the enlargement does; the supply for the Henrylyn district must come from Standley lake, including the 50,000 acre-feet sold to the Henrylyn district. Cannot say how much has been sold out of Standley lake.

Unsold stock referred to on direct-examination was stock in the hands of the trustees who had charge of the Denver Reservoir Irrigation Company business; thinks 210,000 acre-feet ought to be sold, and that Standley capacity represents half the system—that is, with 125,000 acre-feet of reservoir capacity, 210,000 acre-feet of water will be sold. Did not intend to say that all of the water supplied would come from storage. There would be direct-flow rights passed

through Standley lake; there is a considerable amount of water available for direct flow from Clear Creek; also water available from Marshall lake, and from the O'Brien canal.

The direct flow from Clear Creek would be recent. The Marshall lake direct flow is a relatively new right and small in quantity; would not be surprised if the sale to Henrylyn was 75,000 acre-feet.

A purchaser of shares in the Denver Reservoir Irrigation Company gets a right to share proportionately in all the sources of supply of that company, which has a reservoir capacity of 120,000 to 125,000 acre-feet, with the understanding that the company reserves the right to sell 210,000 acre-feet, modified by the consideration that it is intended to build Standley to a 90,000 acre-foot capacity; there is no guarantee. The sale to Henrylyn was made at the price of $500 per share, or $50 per acre-foot; that includes a share in all of the diversion works, canals, and so forth.

Standley lake differs from Cheesman lake, in that Cheesman is a stream-bed reservoir, and Standley lake takes its supply through a canal, and Standley has to deliver through ditches and structures into the Platte river; Cheesman delivers into the Platte river direct. Henrylyn acquires a proportionate interest in the O'Brien canal, but does not know what that interest was.

Witness understands that if Henrylyn district wanted Cheesman water, Standley system might refuse to carry it. So far as witness knows, the Henrylyn people acquired the right to have their water carried through the O'Brien canal from the Platte river to the boundary of the district.

827 Impossible to say what part of the $50 acre-foot purchase price applies to the structure; has not clearly in mind whether the distribution canals in the Henrylyn district were built by the district or not. Cannot tell what part of the purchase price of $50 per acre-foot should be apportioned to the cost of the Henrylyn district's interest in the O'Brien canal.

When asked to justify the price of $35 per acre-foot of Cheesman, as compared with $50 for the Denver Reservoir Irrigation Company, witness says that the Henrylyn water was paid for in bonds, and the bonds had to be discounted. Witness believed that the bonds were worth their face, but it is not turning out so. The 1907 sales were not cash sales.

Estimates of the probable yield of Standley lake would not be as accurate as the estimates of the probable yield of Lake Cheesman.

The land lying under a system always limits the possibilities of sale. Cheesman reservoir has greater possibilities of sales than Standley, and a consequent wider market.

Purchasers of Denver Reservoir Irrigation shares have not paid in cash, and they are being carried, and many are past due. The price assigned to Lake Cheesman is assumed to be spot cash.

The values assigned to Lake Cheesman and Lake Marston are strictly for irrigation; does not undertake to say what would be the value of those reservoirs for use in connection with supplying the city and county of Denver and its inhabitants with water for do-

mestic and city uses; would think its value would be much greater than for irrigation purposes.

Redirect examination by Mr. Nye:

Report made for J. G. White and Company on Denver-Reservoir Irrigation Company system in 1907 had to do with location and availability of land which it was proposed to water and prices they would probably bring when watered; involved no engineering features; inquiry was limited in time and to specific things; something like 30,000 acres are now watered under the High Line; the remainder of the 90,000 acres mentioned by witness has not been watered, and the water from Cheesman could only be applied to 30,000 acres as supplemental supply.

If Cheesman water was used for the larger acreage it would be a full supply as to part thereof. Referring to diagram on Exhibit 40, comparing Cheesman supply on a 60,000 acre-foot draft and the Brantner supply, it appears that while Cheesman supply would have been 100 percent efficient in 1902, a shortage of water in the stream in that year is seriously reflected in the available reservoir supply for 1903.

828 Witness thinks page 9 of exhibit 44 shows that the Brantner and Fulton ditches were getting an adequate supply in a normal way in the year 1913. As to the Home Supply ditch, there are ten shares to the right, one share for 8 acres, 80 shares for a right.

The available water of The Denver-Reservoir Irrigation Company at the time of sale of rights in 1907 and 1909 was through the Church ditch and Community System; first sales of Denver-Reservoir Irrigation Company water were on the following basis: A contract was made between the company and the purchaser, which was in effect a promissory note, for $50 per acre-foot, or $500 a share; the time for first payment of interest was not to commence until work had progressed to some certain stage, and after signature to agreement the purchaser executed a mortgage upon the land, to which the water was to be applied; no cash payments were made; these contracts and mortgages were deposited with the trustee in Chicago, and against them the bonds of The Denver Reservoir Irrigation Company were issued, and these bonds were then sold by a bond house. (Plaintiff objected to testimony as to the price at which bond house sold the bonds, which objection was overruled.)

Bonds sold at 80 to 85 cents on the dollar.

It was at first attempted to sell the water on the basis of a delivery at the outlet of the reservoir, but none were sold under those terms; some were actually sold under provision that the company was to construct main canals, which it did, and also constructed the branches; the delivery was then at the headgate of the canal under which the water was to be used.

The difference in value between the Cheesman Lake and Marston supply on one hand and The Denver Reservoir Irrigation Company supply on the other, would be that the latter company have built a very extensive distribution system at a cost of not less than $15 per acre of land served.

Recross-examination by Mr. Dorsey:

The obligation assumed by The Denver Reservoir Irrigation Company for delivery on east side of the Platte was to deliver at the headgate on the east side of the Platte; the quantity delivered was to be that proportion of the water in the reservoir which the users' shares bore to the total shares issued; measurement to be made at the intake of the canal.

Witness is not sure what interest purchaser acquired in the reservoir. As for the intake to The Denver-Reservoir Irrigation Company reservoirs, the reservoirs themselves and the outlets, in comparison with Cheesman Lake, Cheesman Lake is both intake,
829 reservoir and outlet. The sale of sixty-five or seventy-five thousand acre-feet was the largest and the last sale made.

In estimating the value of Cheesman water, witness considered that perhaps 25 per cent of it would be sold to the High Line as supplemental water; perhaps the supplemental water would be worth more and perhaps less; did not intend to limit valuation to a consideration of High Line supply; value fixed was assumed to be net selling price; did not intend to deduct overhead cost and expense of making the sale; started with an assumption of $50 for a sufficient supply for the land; could not think of Cheesman's total supply being used as supplemental water; would say that if it could be so used, it would bring more. Witness knows more about soil, its fertility, productivity and the character of crops, than about other phases of farming. Witness' reports have been generally directed to that point; has had to examine reports on the sufficiency of water supply, value and kindred questions, and pass upon them.

On two or three occasions has assumed that reports on such questions have been true, and had occasion to regret it. In a good many of the J. G. White reports, has had to go deeply into the subject; could not say that years of drought and years of plenty follow one another in any orderly succession; according to the doctrine of probability, there is less probability that a year of dry flow will be followed by another similar year.

FREDERIC W. TAYLOR, witness for defendants, resumed.

Redirect examination by Mr. Nye:

Finds in the office of the state engineer certified copy of a decree entered in Boulder county December 19, 1901, in case of The Farmers Irrigation Ditch Company vs. The Consolidated Hillsboro Ditch, wherein occurs a provision reciting that the Big Thompson Canal No. 1 has priority No. 1 on Big Thompson river, dating from November 10, 1861, for 96.5 cubic feet per second, and that the Consolidated Hillsboro Ditch owns 4/14 thereof. That ditch is said to be using that amount of the first priority.

Recross-examination by Mr. Dorsey:

Does not know what proportion of the entire Consolidated Hillsboro decrees and priority the No. 1 water makes up.

830 ANDREW M. PATTEN, a witness for defendants.

Direct examination by Mr. Nye:

Has been connected with the Union Central Life Insurance Company of Cincinnati for seven or eight years, and is now taking care of certain loans for them; duties have been to pass on farm loan applications for it; has lived in Colorado 26 years; was county commissioner of Adams county for four years; is familiar with every irrigated district in the state; is familiar with the irrigation systems along the valley of the Platte, through interest in certain water rights and as representative of the insurance company; has had to examine practically all the essential ditches between Denver and Greeley, and investigated their value, by getting the amount of water required by a farmer and the efficiency of the same, and then consulting records in the state engineer's office, visiting both owners, farmers and available records; is interested in corporations that own lands under the Farmers High Line and the Standley system; has investigated northern beet fields from Boulder to Greeley, in the Arkansas Valley; has had extensive acquaintance with the territory in general; has kept generally advised of land and water values in the district in question, and has recently made special investigation of water rights from Denver to Platteville, and the tributary streams of the Big Thompson, Poudre and others; has made inquiry from people using the water, both land owners and tenants, as well as the officers of the ditches; through tenant, is now farming irrigated land; has farmed land for others; was at one time interested in land under Marshall Lake, some land irrigated under Farmers' High Line, some under Standley system, also interested in holdings that are irrigated from the Poudre Canal and Reservoir Company; that land is within a radius of seven miles from Wellington, north of Fort Collins; is familiar with the Brantner ditch, Fulton and Farmers Independent, which he has recently investigated; previously, had a good knowledge of all of them; some are very hard to get information about.

In years past has repeatedly tried to get information concerning them, with no success. Recent investigation was made as a personal investigation from the owners of the land, to try to confirm, if possible, witness' own conclusion; knows the market value of land and water under the ditches mentioned; also investigated the Burlington ditch.

(Plaintiff objects to witness testifying as to the value of water for an acre under Brantner ditch. Overruled.) Water for Brantner ditch is selling for $300 per share, when selling; a share consists of 11 inches of water; this would be $27.25 per acre.

831 The market value per acre of water under the Fulton ditch would be $42.80; an inch is supposed to water one and three-fifths acres; one inch per acre is required under the Farmers Independent; the present shares call for 8 inches; values them at $300, or $27.50 per share; could get no information on the Brighton ditch, but thinks it would be governed by the Brantner, which is a parallel ditch; has no other way of telling the value.

The market value of shares of the Burlington ditch is $100 for four inches. Four years ago paid $130 a share for some, but is

now offered 8 shares at $90 a share; these shares carry one inch per acre.

Market value of water per acre served would be $25; shares under the Farmers High Line are worth $1,250.00 per share, 10 inches to the share, one share will water 30 to 35 acres; the efficiency of this water stock is increased by private reservoirs, by the use of which five shares is considered a good right for 160 acres; the market value per acre of land served is $35.70.

Farmers High Line supply is a good and sufficient supply for the land. The East Lake Water Company has direct and stored supply. The direct supply from the Farmers High Line is worth $35.70 per share and runs one and one-fourth acre-feet per share per season. The reservoir capacity is well worth $30 for three-quarters of an acre-foot, and the two combined into a water right would be $65.70 for a two acre-foot right, and would supply around two acre-feet to the acre; that would make $32.85 per acre-foot delivered on the land. In fixing value of water of the ditches testified to, considers water delivered at the headgate. Witness has had general knowledge of all ditches in the Poudre district testified to by Mr. Taylor, and has made a recent investigation, at which made personal inquiry of users of water under various ditches, and of officers of the company and owners of water stock; aimed to ascertain actual market value of the water; investigations surprisingly confirmed previous opinions. Under the Larimer and Weld County ditch, one share represents 1.44 second-feet, market value of which is $4,000; supplemental supply from Terry Lake and other reservoirs; one share of direct flow and two shares of storage rights serve 160 acres; total market value $8,000; $50 per acre of land served. Has a notation of sales of water stock in 1911 for $4,500 or $4,600, but present inquiry shows that direct-flow shares are selling at $4,000; supply is good and sufficient.

Witness' East Lake property is located on Union Pacific 14 miles north; small settlement there. Union Central Life Insurance Company has close to two and one-half millions in farm loans
832 throughout the state; witness' office handles them all; makes nothing but farm loans.

Is familiar with the Larimer county canal; one share supplies 80 acres, shares selling for $3,000; has notation of a sale in 1910 for $3,750; present market value is $3,000; $37.50 per acre of land served, includes good reservoirs; delivers a sufficient amount of water for lands on which used.

Larimer County Canal No. 2 Irrigation Company supply, part direct flow and part storage; officially known as the Cache la Poudre canal; value, $50 per acre of land served; one share for forty acres.

Consolidated Hillsboro, one share represents 50 inches for 80 acres; market value $1,800, direct supply; the highest value at which these shares have been sold $3,000; at $1,800 it would be $22.50 per acre of land; at $3,000 it would be $37.50 per acre; the present value is $1,800 per share.

Consolidated Home Supply ditch, one share represents 10 acres; market value $400; stock sold in December, 1912, at $450; shares sold in the spring of 1906 at $500, which would be $40 per acre of land served. Hypothetical question put to witness and asked to tes-

tify as to market value of Cheesman and Marston lake rights, objected to and overruled.

Thinks the assumed Marston Lake Supply and the assumed Cheesman supply on a 60,000-acre foot draft would be worth $45 to $50 per acre-foot at the headgate of the ditch using it; worth less at the reservoir, in proportion to the seepage, percolation and losses; that would be net price to owner, he to assume a reasonable maintenance charge upon the ditch that he conducts; water would be worth $45 to $50 to the consumer.

Value to the seller would be that price less cost of selling and loss, and interest on the investment; would not include maintenance charges, but would include overhead charges. Marston lake water might not be quite as valuable, as the possible market for it would be very limited; for example, could not deliver to the English High Line.

Does not think market for Marston and Cheesman water could be found to absorb it all as a supplemental supply, without a considerable delay, if at all. At $50 per acre-foot, witness considered it as a supplemental supply for ditches already constructed; would not be as valuable as an original and sole supply, because the lands to which it would be applied would not be as valuable or as well located, and would be raw, and the expense of constructing ditches and laterals would be greater; estimates water would be worth $15 per acre less for sole supply.

833 Cross-examination by Mr. Dorsey:

Prior to association with insurance compan,, witness' business was farming irrigated lands; has not been engaged in the business of buying and selling water rights, but has been engaged in constructing ditches and reservoirs; never connected with the sale of water rights separate from the land; is in the business of selling lands and water rights together all the time; was interested in the old Denver Land Company and in another company outside of Colorado; would qualify by saying that to some little extent has sold water rights separate from land, one purchase amounting to $17,000; bought for the purpose of speculation and resale; witness used some of them on his own lands; has speculated somewhat in water rights under the Burlington.

In some instances knowledge of sales of water rights in Poudre and Big Thompson districts was derived from what others say, in some instances not; familiarity covering a period of seven or eight years; although owning lands under the Poudre Canal and Reservoir Company's system, is not well posted on it and does not testify to it. Recent investigations of Brantner, Brighton, Fulton and Farmers Independent and Burlington resulted in information different somewhat from former impressions. As to the Brantner and Brighton ditches, lands possible of irrigation thereunder are now irrigated, but not true as to Fulton, Farmers Independent or Burlington.

There is a new High Line-Fulton ditch having a flood-water right, that could be bettered by the use of Fulton stock.

The market for shares under the Platte ditches mentioned is exceedingly limited, if one excepts the Burlington, and possibly the Farmers Independent, and to some extent the Fulton; this fact has

a marked influence upon the market value; knows nothing about the corporate organization of the Brantner; is not aware that the Brantner was built and originally owned by an association of nine persons.

The amount of land irrigated under the Brantner is limited, and there is not a possibility of applying this water on newer lands, but more intensive cultivation of the present lands may require more water, and that is about the only market that would open up; knows it as a very early ditch, a very good ditch, and that it supplies all the water that the farmers under it seem to require. The term "one inch" refers to the statutory inch which signifies a rate of flow.

One share of Brantner stock receives at the rate of 11 inches per share, fluctuating with the supply of the ditch; has never used water under it; possibly witness' informants meant that each share of the Brantner ditch entitled the owner to a proportion of the total yield of the ditch that his shares bear to the total outstanding
834 shares; market price of $300 per share was confirmed by inquiries of land owners and officers of the ditch, undoubtedly based upon the last sales made.

There has been very little changed hands; the low price of the Brantner ditch rights per acre, as compared with the later rights of the Fulton, Farmers Independent and Burlington, is not remarkable, when the possibility of market for them is considered. Thinks that the comparison of value is somewhat along proper lines of valuations of the amount of land which would create the market. Under the Brantner, practically every acre is in a high state of cultivation; under the other ditches mentioned, water is taken farther away from the river, and there is a greater market. The purchaser of a share in the Fulton ditch acquires one inch; does not mean that the purchaser gets an inch, but he must take that proportionate part of the total supply as compared to the total shares. Thinks there are 20,000 shares; does not know whether they are all unused. Does not think there is any considerable quantity of floating stock under the Fulton; does not know whether it is all issued and used; got information as to market value of Fulton shares in the same way as others; has information that in 1906 Fulton shares sold at $100 per share; was not informed of any other sale; from observation, would say that one share is sufficient to irrigate one and three-fifths acres; by applying one and three-fifths acres for each share, arrived at market value of $42.80 per acre.

The present appears to be a period of depression in the value of water stock; witness thinks it will last for a couple of years, and then improve. Does not think the present price is normal. Only knowledge of sales in Fulton ditch was a sale at $100 per share; was not informed of any recent sales at $65 and $75 an acre; does not know the circumstances of the $100 sale.

The amount of water obtainable on the shares would fluctuate with the number of shares in use at a particular time and with the available water in the stream; is not informed that 3.3 acre-feet per share is the yield of the stock for the number of acre-feet actually delivered. Can only state as to the amount of flow maintained in the ditch and

the months in which it occurred, from observation; has never conducted operations under the Fulton; it was incorporated for 2,770 shares, par value $20,000; all the land under the ditch is actually irrigated, and it restricts the market, but not to the extent of the ditches on the other side of the river, because there is a larger area and more people served.

Referring to Exhibit 44, page 12, where the acreage of the Fulton ditch is reported as 11,000 possible and 10,795 actually irri-
835 gated, witness states that that conforms to his understanding, so there would be but a small number of additional acres to which Fulton water could be applied, unless it would be possible that the Fulton High Line can utilize it; does not mean to say definitely as to that, but has the impression that it can be done.

Knows that a number of ditches having excessive decrees have enlarged their capacity and extended their ditches and used the water upon new land, and thereby acquired the right. Only gave limited consideration to so-called Fulton-High Line ditch; additional market more likely to be brought about by transfer from certain present owners to others who intensify their cultivation; does not know what acreage the Fulton-High Line brings under irrigation. The assumed added market for the Fulton ditch water would be very limited; no storage supply under either Fulton or Brantner; has never operated the Farmers Independnt ditch, but has operated farms under it; has a few farm loans under the ditch.

Arrived at the estimate of 8 inches per share from personal knowledge and information. The Fulton ditch supply of one inch to one and three-fifths acres is adequate; knows that the owners of shares under the Fulton ditch have been looking for storage water. Knows that the Farmers Independent has an aggregate decree of 526 second-feet, and knows that the ditch capacity is limited to the amount of the decree; thinks that Mr. Bull's Exhibit 40, showing capacity of the ditch to be 150 second-feet is right; if conclusion that one share represents 8 inches is arrived at by dividing the decree by the number of shares outstanding, the result would be incorrect. Information regarding Farmers Independent is difficult to get. It was originally incorporated with a value of $1600 or $1800 per foot; is sure at the present time one share representing 8 inches is worth $300; does not know how the 8 inches is arrived at. One inch is sufficient for an acre; has no knowledge of sales at that price; was not informed of any particular sale; has arrived at a value of $37.50 per acre by dividing the market price of $300 per share by the 8 inches.

There is a considerable amount under the Farmers Independent Ditch which might yet be irrigated, but it is questionable how desirable it is. Exhibit 44, table 12, giving the acreage under the Farmers Independent, and Exhibit 40, showing the actual irrigation thereunder, indicate that the total acreage is served and the market is restricted; there is no reservoir supply.

Could get no reliable information on the Brantner; all land under the ditch is irrigated, with consequent limitation of market; market

might be created by intensive farming on part of the lands;
836 not able to establish any market price for the Brantner water; arrived at the representation of the Burlington shares from general information.

Divided the total quantity of the Burlington decree, expressed in inches, by the number of shares, and arrived at the result of four inches per share, which might fluctuate with the number of shares in use, as well as the run of the water in the ditch.

Four thousand shares in the Burlington ditch; believes it will deliver four inches per share, but not running continuously throughout the irrigation season; does not think the ditch is a fair comparison; it has been to a certain extent a flood-water ditch; has seen water running in the ditch during the winter months and distributed on the land, as a sort of storage; some intensive farming near Henderson covered by this ditch.

All things considered, they get very effective use of the Burlington right; the ditch's decree is very late for direct diversion; there has been a great irregularity in total quantities. The market value of $100 per share is arrived at by actual personal knowledge and purchase of the shares; personal transactions occurred about four years ago; witness bought four shares at $130, which was the high market price; has offered the same shares at $100; has a quotation of $130 per share in the year 1911; has no other personal knowledge of sales of those shares; shares have never been used since witness bought them.

Same parties who sold witness his shares recently offered 10 shares at $90 per share, or one share for $100; this was Mr. Tom Miles, a resident of Brighton. Assume the shares offered were unattached and surplus shares; did not inform witness of any other transactions.

Land under the Burlington has not been irrigated to highest efficiency. If statements in Exhibit 44 showing 15,000 acres irrigable under the Burlington ditch, and in Exhibit 40 showing 14,940 actually irrigated, are correct, there is a limited market for Burlington shares. The market price was stimulated four or five years ago because of pending deal between the Burlington ditch and the Denver Reservoir Irrigation Company; arrives at acre price by dividing $100 per share by four; this does not cover any water from the Oasis reservoir, refers only to direct-flow rights. Thinks that the holders of rights in Barr Lake, using water therefrom, make less demand upon the direct-flow rights of the Burlington ditch, and thereby improve the other direct-flow rights; does not know
837 whether there are separate shares of stock in Barr lake; all values assigned by the witness have been to direct-flow rights.

Outside of the Burlington, does not think any great amount of water could be bought at the values stated; there seems to be a number of Burlington shares on the market; has personal knowledge of the market value of shares of the Farmers High Line; most recent sale known to witness was in July, 1914, when two shares were sold. There were originally 1,100 shares in the Farmers High Line, but it was increased six years ago to 1,250. July sale was at $1,250 per share for unattached shares, sold apart from the land. The

superintendent of the ditch bought two shares through witness' office, so witness knows of the sale of a total of four shares, but is informed that no shares have sold for less than that, or for more.

Thinks four years ago eight shares sold at $1000 per share; price has been gradually advancing. The system is being constantly improved. Has been informed that the shares will carry as high as 18 inches. Originally the company was incorporated for $110,000, par value $100 per share, stated to carry 10 inches. Knows that at the present time a share carries more than 11 inches; does not know what the old rights recently purchased by the company aggregate; does not know that the total quantity so acquired was 6 second-feet; very large percentage of users under the system have private reservoirs.

The East Lake project, eliminating waste land, has 1450 acres of cultivated land; the East Lake company has 41 shares of the Farmers High Line, together with certain undecreed storage rights; the reservoirs are being filled from the Farmers High Line stock; including the actual land consumed by reservoirs and the construction of the same, with ditches, and so forth, price would equal $40 per acre-foot; this makes a cost of $65.70 per acre, consisting of one and three-fourths acre-feet direct-flow and three-quarters of an acre-foot storage, this arrived at by considering direct flow at $32.85 per acre-foot and stored water at $40 per acre-foot; this stored water being merely storage of the direct flow on the shares; thinks such a storage is protected by the decree; there are certain storage rights connected with the Farmers High Line Canal and Reservoir Company; the storage rights are a part of the water rights represented by the shares; there is an outstanding indebtedness, but the stock goes on the market without considering any indebtedness, and pays $5 a year per share to a sinking fund, in addition to the maintenance charge, which is nominal.

The Poudre systems referred to are situated in a higly developed section; in one system there may be both direct flow and storage rights separately acquired; did not make any investigation of the market price of storage water and storage rights, and could
838 not say what they would be except in connection with the Terry Lake right.

Knows of no actual sales under the Larimer & Weld at $4000 per share, but thinks he was reliably informed; those direct-flow rights require supplemental storage; a Terry Lake right is $2000 per share; does not know how many shares there are in Terry Lake; does not know how much water a share represents, except that it is sufficient for an 80-acre tract; does not know the assumed draft on Terry Lake, or the average delivery; has not the data from which to arrive at the acre-foot value of Terry Lake; in regard to Larimer County canal, does not know what the storage reservoirs of that system are; does not know what the delivery is therefrom; cannot tell the market value per acre-foot of storage rights, and did not investigate the question. Larimer County No. 2 irrigation system is near Fort Collins; will not attempt to locate it; it; is a combination of direct flow and storage; does not know whether both classes of

rights are carried by the same shares; he basis the value of $50 per acre-foot on the yield of the combined rights; does not know the market price per share; does not know what reservoirs the canal gets storage from; got information from Mr. Nelson, but did not get information of quantity derived from the storage rights; has made no investigation as to reservoir rights separately.

The Consolidated Hillsboro is direct-flow supply.

Arrived at the yield of 50 inches per share from general inquiry, and arrived at the information that one share is sufficient to irrigate 80 acres from various farmers connected with the system; has some knowledge from personal observation, and would say that a share gives an adequate supply throughout the season for 80 acres; has no knowledge or information of any sales at $1,800 per share.

Had information that shares had sold at $3,000; no shares were offered to witness at $1,800, and witness does not know who has them for sale at that price; took the price of $1,800 to be the present market value possibly within the last few months or a year.

Thinks 153 second-feet is the decreed quantity to the Consolidated Hillsboro; there is no storage supply.

Home Supply ditch has both direct flow and storage; one share will irrigate 10 acres market value, $400 per share, derived from what witness considered reliable information; got no specific instance of sale; except in 1912 there were sales at $450 per share; one share sold in the spring of 1906 for $525. Thinks the market price has decreased.

Did not go into the value of the storage rights.

839 Attention of witness called to Mr. Taylor's testimony, in which it was stated that the shares of the Home Supply ditch were in groups of ten, ten shares being denominated a right. Witness disagrees slightly with Mr. Taylor, his information being based more on former knowledge.

There seems to be a difference of opinion among the different informants that witness and Mr. Taylor had recourse to. Informants did not always confirm each other. Witness has not bought or sold storage rights in reservoirs in the vicinity of Denver separate from lands. Experience has been with lands and water rights attached. Union Central Insurance Company does not make loans on water rights separate from the land.

In loaning money it is necessary to make careful inquiry into the value of water rights. Is willing to concede that the Cheesman and Marston water rights on the basis of Mr. Nye's hypothetical question would be worth $50 per acre-foot delivered at the headgate, but would like to have it understood that the maintenance charge must be reasonable.

Witness' estimate represents value of Cheesman water delivered at the intake of the ditch through which it is used; is not qualified to make an estimate of the losses in delivering water from Cheesman to the intake of the ditch; knows that the Platte river from Cheesman down the south Platte, has a rocky bed; does not think the loss at that point would be great, but there is always a loss arbitrarily allowed by engineers.

Estimate was based upon assumption that the amount to be furnished from Cheesman and Marston would aggregate 90,000 acre-feet per annum, possibly 100,000 acre-feet, and had in mind that the disposition of that amount of water would be a long-drawn-out operation; did not necessarily consider that the placing of that much water on the market would depreciate values, but figured the time it would consume; the latter fact did not affect the value. By "supplemental supply" witness means where ditches had a certain direct run and not quite enough water, or where territory was being brought under more intensive cultivation. Knows that in a physical sense there is a large irrigable acreage under the English High Line, amounting to 90,000 acres, but did not consider the larger acreage in connection with a supplemental supply.

Considering the East Denver Municipal District extensions of the High Line, there are now 90,000 acres of land that could be irrigated under it, for which it would be unnecessary to make additional construction. Witness' estimate of difference in value between supplemental and sole supply was not entirely based on additional cost of construction; the water would not be worth as much as a
840 sole supply on raw land a greater distance from Denver as upon the lands upon which it could be used for supplemental supply; the duty of water has considerable to do with the answer.

Is ready to say that a large part of the Cheesman supply would be supplemental. The estimates made by witness on the Lake Cheesman and Marston supplies are strictly confined to irrigation uses; has no knowledge as to the value of the water for domestic supply for the city and county of Denver.

Redirect examination by Mr. Nye:

In putting an estimate of $50 per acre-foot on the Cheesman and Marston rights, witness considered that the purchasers of such rights would have a proportionate interest in the reservoir constructions.

FRANK J. MEDINA, a witness for the defendants.

Direct examination by Mr. Nye:

Resides in Denver; came here first in 1880; has been a constant resident for 25 years; is in the land business; represented the D. R. I. Company in the sale of water in 1908; sold company stock, which carried with it a certain amount of water; went to the farmers under the Standley lake; first work was in the territory on the west side of the Platte river and north of Denver—between Denver and Broomfield—served by Standley lake and Marshall lake; sales were made to the owners of land; later sales were made to districts; the Denver-Greeley district was organized in February, 1909; did not make the same effort to sell to individual owners after the districts were organized; there were four or five agents continuously at it; sold water at $50 per acre-foot for delivery at the farmers' headgates in the main ditch; thirty shares would cover all that was sold to individuals. The irrigation districts were organized to dispose of the stock to the individual land owners in the district.

Sold water to the district in exchange for bonds. Bonds had to be sold at a discount. In the Denver-Greeley district there was 62,000 acres, each acre entitled to five-eighths of an acre-foot; this made about 4,000 shares. The Denver-Greeley district is as large as all the other districts put together; there were not 100 people in that district; there were only 9 votes in the organization; it was a dry country; there were some people in the St. Vrain district and some in the North Denver district; the North Denver district consisted of company land almost exclusively.

841 Milton Lake capacity is supposed to be 42,000 acre-feet; thinks there are about 18,000 acres under it, including seepage land; was with the D. R. I. Company from July, 1908, to July, 1911, with one absence, and then remained until April, 1914; had charge of the water and the rights of way; during that time sold 8 or 16 shares to the same man.

Made an active effort to sell the water; have recently made efforts to sell water under Milton lake; offered stock at $400, or $40 per acre-foot; did not sell any supplemental supply. Had excursions, entered into correspondence, and followed up the correspondence; and sold water to people in Iowa, Missouri, Kansas, Nebraska, Utah, Oregon, California, Arizona and New York; at the time commenced selling rights, practically no construction; and witness continued until Standley lake was completed.

Market was best in 1909, when the districts were organized, about the time of the real construction work; after construction completed, market was not good; thinks the boom had busted; the excitement of construction helped in the sales; the enterprise looks better during construction than it does after construction; $50 per acre-foot was the gross price received by the company; rights sold on time; never got any cash; took bonds in exchange from the districts; sold under water rights purchase contracts; provision made for first payment and security for the balance, in the shape of trust deeds or mortgage on the land; lately the policy has been to hold the water rights as security; the terms on which some were recently sold were one-tenth down in cash and the balance in annual payments; early sales did not have a payment down.

Cross-examination by Mr. Dorsey:

Milton Smith was one of the promoters and stock holders and officers of the company; that period of stock sales beginning February, 1909, was about the time of the organization of the district, and continued until June, or thereabouts, of 1910. Don't know what was done during receivership; went into the hands of receiver June 6, 1910. The campaign which preceded receivership was an effort to sell stock to individuals. At that time Standley lake was being constructed. Took farmers over to see the work. Joe Osner was there at the time. The first campaign was in what was known as the North Denver district, water to be supplied from Standley Lake and Marshall Lake—the larger part from Standley—and was proposing to farmers that they mortgage their land to buy rights to be supplied from the reservoir, which had not been completed, and

the only definite knowledge on the part of the purchaser as
842 to how much water he would get for each share of stock depended upon what was told him by the agents; some evidently believed in the estimates where they bought the stock.

Had statements of the amount of money that was to be put in, and the contracts had been let to substantially our estimate, but had not then let the big contract to Kennifick & Quigley; shares were supposed to represent 10 acre-feet; there was no guarantee of water; no company would do that. The purchaser would receive either ten acre-feet or his proportionate share of the water in the reservoir; each share was to represent 10 acre-feet, but agents did not say what would happen if water was not there. The farmers would understand that they were merely entitled to their share in the yield in case of shortage. In 1908 was selling on a basis of 100,000 acre-feet; did not agree to sell not more than 100,000 acre-feet; had the privilege, in case water supply was increased, to sell more; the estimate of 100,000 acre-feet was backed up by Marshall Lake and Standley Lake capacity; actually sold shares with the understanding that Standley lake would produce 100,000 acre-feet; does not know that it was represented that Standley lake was to be 100,000 acre-feet; did not sell more than two or three thousand acre-feet; reserved the right to use Standley lake for lands on the east side of the river, but used the other lake instead, and afterwards got Milton lake and enlarged Barr lake; water has been sold on the east side; that is to be supplied from Standley—one very large quantity. Gave people to understand that Barr Lake and Milton Lake would supply water on the east side, and that they should look there for their water; the sale to the Henrylyn was made after the receivership.

Don't know whther it was the original idea that all water was to be sold on the west side of the Platte river. Agents' campaign was to persuade people that water could be kept on the west side, but did not meet with much success; represented to a purchaser that there was sufficient water supply, but it would not be guaranteed any more than other ditch companies would guarantee the supply; we put our money into it, and had confidence in it, and would sell so many shares of stock which represented so many acre-feet; anticipated shortage, but expected that under normal conditions the purchaser would get his water; would talk of 10 acre-feet of water to a share, and talks it yet; has not represented that each holder of a share would get 10 acre-feet every year, but 10,000 shares were to be sold. When Standley lake reached completion, it only had a capacity of 60,000 acre-feet; Marshall reservoir had a capacity of 5,000 acre-feet, and was increased to 10,000 acre-feet.

843 Does not think the farmers believed the representations. Has had lots of experience with farmers; did not consider it remarkable that the sales were small, but did no better after the system was completed. About February, 1909, began another branch of the campaign, that was to sell shares to the irrigation districts. After that date, caused several districts to be organized, including Denver-Greeley, to which 4,000 shares were sold, at the rate of $500 per share, or $50 per acre-foot. Part of the water was to be used on

the east and part on the west side of the river—that is, the Denver-Greeley is on the west side, and the Denver-St. Vrain is on the west side, and the North Denver is on the east side; Platteville is on the east side. All these districts were organized and sales made between February, 1909, and June, 1910. Did not attempt to sell the stock on the east side of the river; organized the districts there; took district bonds in payment for the stock; expected to get the water for the lands on the east side from Standley and Barr Lakes. Barr Lake is an enlargement of the Oasis reservoir. Milton reservoir was first conceived after the Denver-Greeley project was started. Barr lake has a capacity of 40,000 acre-feet, from which must be deducted original Barr Lake capacity of 10,000 acre-feet, of which the D. R. I. Company owns a part, controlling, say, 35,000 acre-feet. Milton Lake and Barr reservoir together have a capacity of about 75,000 acre-feet; these are the company's two reservoirs on the east side, and Standley Lake and Marshall Lake and McKay Lake and West Lake and others on the east and west sides; 140,000 to 150,000 acre-feet capacity all together; about 14,000 shares of stock sold, representing 140,000 acre-feet; about 7,000 more for sale, making a total of 210,000 acre-feet.

This is a combination of reservoir and direct-flow rights; do not know what would be obtained from the direct-flow rights; does not know what the decreed capacity of the direct-flow right is. When speaking of the delivery of water at the canal headgate, witness had reference to the headgate of the farmer's lateral. Does not think there was any provision in the contracts requiring the delivery of water at the farmer's headgate. Would not guarantee 100 per cent delivery; there is no ditch in the country that does it, and one would not do it with any reservoir.

No company has ever guaranteed water; if it did not rain here for ten years, none of us would have water, but Standley Lake had the capacity, and competent engineers had given the owners to understand, after thorough examinations, that a certain amount of water could normally be expected, some years more, some
844 years less; does not know what the engineers' investigations covered, nor what result they arrived at with regard to the efficiency of the system.

There was not a time when he sold in excess of the capacity, except insofar as the construction work was not complete. Even though stockholders are entitled to participate in whatever the supply is, it would make a difference whether it was measured at the reservoir or at the lateral; if at reservoir they would not get as much water at the headgate. If there was a shortage of water, the shareholder would only get his proportion of the water in the reservoir. Witness supposes it could be measured in one place as well as another.

Purchasers of shares would be entitled to participate in whatever water there is in the reservoir; thinks, however, that a man down on the ditch would be entitled to have those higher up on the ditch contribute for his benefit, in that the man down the ditch whose seepage is great would get more water out of the reservoir than the

man up the ditch whose seepage is less. That has not been the custom in Colorado, but that is the D. R. I. Company's scheme; there is nothing in the share of stock which indicates that, but there may be letters to that effect. Never heard of any irrigation system that had such a contract, but that is the D. R. I. Company's intention.

Does not remember whether Milton Lake had been completed in July, 1910, at the time of the first receivership, but does not think it had. Barr Lake and the O'Brien canal had not been finished; kept in close touch with the situation during the receivership, although not employed; selling campaign was inactive during receivership; mostly engaged in making arrangements to go ahead with construction.

The condition of the D. R. I. Company had been bad for a considerable period before it went into the hands of a receiver, but the agents did not commerce to notice it until 30 or 60 days before. Does not remember financial condition of the company interfering with sales; sold some stock right up to the last month. When witness says he sold stock, he includes land. Witness only sold 15 or 16 shares in his campaigns prior to 1910.

The company officials took a number of shares; does not know what they gave for them. The fifteen or sixteen shares represented 150 or 160 acre-feet, and all the other agents sold about an equal amount. Means to say that financial conditions did not affect sales to the districts, abandoned individual sales for district sales; it was easier.

Sale to the Henrylyn was made when the company was in financial difficulty during interruption of construction work, while the
845 company was in the hands of receivers. Henrylyn was not organized by the company; Henrylyn took 75,000 acre-feet for bonds.

The reservoirs in the Henrylyn district could only be used to impound the supply which the D. R. I. Company furnished; floodwaters had been used through the O'Brien canal in the summer of 1913.

Milton reservoir gets its supply from the Platte river and through the Beebee canal, which comes down through the center of the Greeley-Valley district; this is a seepage canal, built by the D. R. I. Company.

Does not know what was the object in constructing a reservoir of 40,000 acre-feet for the purpose of irrigating eight or ten thousand acres. The market for the Milton lake water is very much restricted; does not think that the people under Milton lake have the money to buy.

Has sold water out of every one of the lakes, by selling to districts.

The Denver-Greeley Valley Irrigation District has stock in the general system, and gets its supply from such parts of the system as the operators think advisable; cannot tell how many acres in the Denver-Greeley district get water from Milton lake.

There is a lot of land that has no other available source of supply.

All kinds of legitimate schemes had to be worked to sell the water. Purchasers agreed to pay interest on the deferred payments.

Before going with the D. R. I. Company was traveling salesman. State oil inspector, bailiff in the district court, water commissioner of the city of Denver, all of which positions, except traveling salesman, were political positions; was bailiff of the district court for six years; has learned the water business principally in the last seven years. The position as water commissioner for the city involved the operation of the City Ditch.

Thinks political experience qualified him for work with the D. R. I. Company.

Redirect examination by Mr. Nye:

In speaking of certain water sales as "inclusions," means that some person was induced to include his land in the district; his land would then be bonded to pay for water acquired by the district; regarded that as a sale of water.

District bonds were taken out of escrow as more land was included.

846 WILLIAM B. MCGILVRAY, a witness for the defendants.

Direct examination by Mr. Lieberman:

Superintendent of asphalt and sewers for 17 or 18 years.

Examined inlets on Lowell Boulevard, 20th, 21st and 22nd, where there had been some connection made from the wooden main on the street to the catch basins and storm sewers. Did not observe the water company mains at that point; water was coming from the wooden main into the catch basin from leakage; the connection with the mains was made where it would drain the leakage water into the sewers; this was done by the permission of the city, on application of the company; observed that condition at a great many places. There are various places along the line where it leaks, and is being repaired frequently, clear out to two miles beyond Wynetka; that was about three weeks ago; they were simply repairing pipes at that point; know of no other such connections in the city. Connections on Lowell Boulevard were made probably five years ago.

Inspected the pipe line on the road to Platte Canon about a month ago, and found many places there where the pipe was leaky and wood decayed in the pipe line, and they were repairing it in sections; where the dirt was cleared away from the main, the pipe was dry; water shut off; there was a great deal of decayed wood; it was being cut out and replaced with new wood; mains were of wood, with steel bands. (Witness produces three pieces of wood which are marked Exhibit 48), which consists of pieces picked up promiscuously at various points, fairly representative of the portions cut out; there were some places there five, six and eight feet long, maybe twenty feet long; inspected several of them—probably four or five places; in some place- cutting out from top of the pipe, which usually decays first, and in some places cut around to the bottom.

The iron bands were in fair condition—a little rusty, but otherwise in good condition. The pipe at either end of the repairs is not very good—not as bad as that cut out. The connections on Lowell Boulevard were made with witness' permission; the leakage from the mains was such that it became annoying for the street traffic, on account of the softening of the street; inspected the places where the connections were made; street was very wet and soft. Thinks the mains at that point were 36 inches; did not measure them; don't know of any change in the sewer connections. There have been no recent applications. Has not observed the mains or sewer
847 connections at other parts of the city; pipe connecting the mains with the sewer was iron pipe; mains were of wood.

Cross-examination by Mr. Dorsey:

Duties are to see to the flushing, cleaning and keeping of sewers in repair, both storm and sanitary; is under the commissioner of improvements, John B. Hunter; has been superintendent of asphalt, paving, stone, concrete; has care of all the streets, and keeps them in repair and resurfacing; has been witness' business for seventeen or eighteen years, with the exception of two years.

Was stone cutter and mason. Lowell Boulevard is in North Denver, lying just to the east of Sloan's lake, in the extreme western part of the city; settled fairly thickly up towards 23rd avenue and in through that way. The main of the water company referred to is one of the conduits which leads to the Ashland Avenue reservoir; was constructed quite a long time ago; the connection with the sewers was not made when the conduit was laid; would not be positive of that, but think it was made a long time afterwards; did not keep any tab on it; connection made at three places—20th, 21st and 22nd. Knows of no other application. Main extends for several miles within the city limits, along Lowell Boulevard.

Very little water running through the sewer connections at this time; have seen the connections three or four times since May; inspects them by taking up cover and looking into the manhole. Sometimes more is running than others; when inspected about a month ago very little was running; about a year before that it was running a little heavier.

Water was leaking from the main when the connections were made. There are various places where it is leaking, probably nearly as bad; many places in the city where it has leaked; no other connections have been made; the company takes up the dirt around the pipe and repairs it; that corrects it to a great extent.

Went out on the Wynetka trip with Mr. Phillips and Mr. Hill; Mr. Hill was some gentleman with Mr. Phillips; went out by automobile, by Littleton, clear to Wynetka, and along the pipe line; struck the pipe at Wynetka, then went along the road at Wynetka up toward Platte Canon; knows he was following the line of the pipe; expects it is the same pipe that comes in on Lowell Boulevard; thinks there are two pipes in the vicinity of the road; was looking at the one on the east side; nothing about the one on the west side

to look at; the east side was uncovered and excavated in repairing the pipe. The pipe was uncovered in four places.

848 Made one trip of inspection; probably went three miles beyond Wynetka; in that distance found the pipe uncovered in three or four places; in some places it was uncovered for 20 feet; in others 8 or 10 or 15, maybe 6 or 7 feet; water company men there and repairing pipe; could not tell whether he went as far as Chatfield or the Wayside ranch; out there half an hour or so; has brought three pieces into court, but has more of them; could not tell just which place they were picked up; they were waste pieces thrown away.

Has helped to work on wood stave pipe for the Denver Union Water Company, about 18 years ago; built in wooden water pipes on the Sullivan line, to keep the pipe from falling apart. Thinks a conduit ought to be sufficient to take care of itself, without stone masonry. If a wood-stave conduit is in a healthy condition it will take care of itself; if it is rotten, it will not.

Has worked some on wood-stave pipe; don't pretend to be an expert in building water mains; has helped repair them. The life of a wood stave pipe is longer at the bottom than at the top. If you keep them full of water they will last longer than when half empty. The condition of the soil may have something to do with it. It may be true that the condition of a conduit in one kind of soil is no indication of its condition in another.

Ground pretty nearly level where repairs were being made. Knows Mr. Sweeney of the water company, and talked with him at the place where the repairs were being made.

Did not inspect the pipe at any place where it was not uncovered. More pipe uncovered than was cut out, in order to give room to work. Just looked at the staves. Went down into the excavation to look at one pipe, where the large excavation was, and the pipe was cut down to the bottom. In the other cases, looked at it from the top of the bank. If the remaining staves had been in the condition of those cut out, they would have been cut out also.

Witness indicates which is the outside and which the inside of the pieces of wood produced in evidence. Staves get bad on both sides. Individual staves differ; sometimes one will give way and destroy much sooner than others; quite a job to repair them.

Is called upon to repair brick sewers. Denver sewers are made of brick, concrete, clay pipe, vitrified sewer pipe.

Need repairs very infrequently; do not remember repairing any except the outlet into Cherry Creek storm sewers. (Witness not permitted to tell to what extent he has had to repair storm sew-

849 ers.) There were at least three or four openings on the conduit inspected; one opening was five feet long; the longest about 20 feet long.

Did not measure any of them; could not tell the real length; does not know the total length of the conduit, probably several miles; thinks the conduit was No. 1.

Redirect examination by Mr. Lieberman:

When witness went into the large hole to observe the ends of the

pipe, the lower end of the pipe was partially decayed and soggy; it was all decayed, to a certain extent.

JOSEPH NOSEK, a witness for the defendants.

Direct examination by Mr. Lieberman:

Foreman of the sewer flushing department of the city of Denver; in the service about eight years; has observed one sewer connection with water mains on Lowell Boulevard between 20th and 22nd; streets were in bad condition; could not say what the condition of the water main was; saw it, but did not observe the condition. The condition of the street was caused by leakage from seepage from the water mains; three connections—two with the storm sewer and one with the sanitary; see these connections every summer; same conditions exist; have not observed conditions in any other part of the city; saw the water company working on the pipes. Saw that they were wood pipes.

Cross-examination by Mr. Dorsey:

Is Mr. McGilvray's foreman; testifying to the identical connections mentioned by McGilvray; does not know whether he was foreman when the connections in question were made; his men discovered them when they were flushing the sewers.

About four years ago was first knowledge of the instance of the connections; observed the streets to be muddy; bad condition from seepage during the course of his work; noticed it the last time he was out this summer; water company employes were making repairs this last summer, near the place where the connections were made.

JOHN HENSLER, a witness for the defendants.

Direct examination by Mr. Lieberman:

Plumber; engaged in that occupation fifteen years, in Denver.

Water company makes a tap, and the plumbers connect onto
850 their taps with the coupling provided by the water company; puts the service pipes into the users' premises; in order to make such attachment, it is necessary to obtain permission from the water company; a written application has to be signed by the owner of the property and by the plumber making the application; this application is a printed blank. Exhibit 49 is a regular application of water company for tapping the water service.

(Exhibits 48 and 49 offered in evidence.)

Size of service pipe is determined according to the rules of the water company—certain specified sizes for certain sizes of houses and lots. An ordinary lot would be ⅝-inch pipe and one-half inch tap for an ordinary five-room cottage. They allow a three-quarter inch pipe for two lots; the tap is five-eighths inch, a smaller tap than the pipe. Guides himself at all times according to the rules of the company. One-inch pipe can be put in for a terrace or large apartment house, or something where there are three or four houses; always uses a tap smaller than the pipe.

The sizes given refer to the inside diameter; the company governs the size of the pipe.

Cross-examination by Mr. Dorsey:

No connection permitted except after application similar to Exhibit 49 has been signed. The company has a fixed standard by which it determines size of the taps into the mains, and regulates size of the service pipes, up to stop box; from that point, the user puts in whatever size pipe he wants.

Redirect examination by Mr. Lieberman:

Having a one-inch pipe and three-quarter inch tap, it would do no good to have a larger pipe inside.

Recross-examination by Mr. Dorsey:

Does not know anything about water pressure.

JAMES J. MOSES, a witness for the defendants.

Direct examination by Mr. Lieberman:

Deputy fire chief for seventeen months; been in department for 20 years next January; now in charge of Capitol Hill district; 8th Avenue north to Elyria, Broadway to City line, east; practice of fire deputy to attend all fires in his district; off service every sixth day; all other days on duty 24 hours; attends all fires in the district.
851 Superintends work of the department at the fire. Several times had difficulty in extinguishing fires, because of lack of pressure where the fire was above the second floor. On February 16, 1914, at 1576 Pearl Street, compelled to work engine 58 minutes to get pressure to a roof fire; pressure from the plug would not raise the water to the roof; had made an effort to do so.

Always have an engine connected up as soon as it arrives. Release horses, take off suction, connect same to plug, and connect hose to engine; always a short delay. Fire was two-story dwelling, and was in ceiling below roof. On April 19, 1914, at 1760 Williams, fire at Mr. Adams' house; took no chances at all on the pressure; had engine connected up at once; fire on the first floor, and worked the engine; might possibly have gotten pressure from the plug, but took no chances; engine was coming along and the fire was going pretty good; it was shooting out of the doors and windows. Hadn't had experience right in that location before. June 22, 1914, a roof fire at 1138 Clarkson; dwelling house; two stories; found lack of water pressure; put the engine to work and used the engine. October 4, 1914, 1517 Clarkson; dwelling, two-story; connected right up to the engine; used chemicals; first-rate stream from the engine.

Had experience further south on Clarkson. Did not make test personally. Reports were sent in to him; made by the chief and master mechanic. Had talked over weak pressure with the chief. (Witness not permitted to say that these conversations were the reason for taking no chances with the pressure, because lower down on Clarkson pressure was weak); registered 19 pounds at the engine.

October 8, 1914, fire on Ogden close to 9th; roof fire; used the engine; made an effort to use the hose at the plug; was not sufficient force to put the fire out.

Connected engine as soon as it came; just the delay of shifting from one plug to another; got a good stream from the engine. November 1, 1914, 1544 Downing; two and a half stories; fire in the roof; worked first with chemicals and then with the engine; from 17th to 10th and 11th Avenues, north and south, and practically from Logan out around Downing have had the most trouble. That is all the cases witness can cite. Has had, maybe, 200 other fires. The ones mentioned were where the engine was worked. Outside of that has not had a great deal of difficulty getting water. There might have been one or two or three others. Selected at random the instances testified to; has had instances where there was not pressure enough to take the kinks out of the hose; and those instances where
connected up with the engine at once it was because the fire
852 had advanced, and thought best not to take chances on anything.

Headquarters engine 8, 16th and Marion. Travels to fire in automobile, and reaches it about as quick as the department.

Cross-examination by Mr. Dorsey:

Deputy fire chief for 17 months. During that time has attended hundreds of fires.

Has not described all of the fires where engines were used; might be a few more; might be eight out of several hundred; is not the practice to connect up the engine whether required or not. If there is a line laid out and using water and the fire is small, they will not connect the engine. Out of the six instances cited, there were three in which the pressure from the plug was not tried; that was because the fire had advanced considerably. It is true that fire in an advanced stage needs heavy pressure; that is why connects engine right away.

In the other three instances the fire was in the roof, and found that the pressure from the fire plug was insufficient to give adequate pressure at the roof at the nozzle. These three instances were 1576 Pearl, 1138 Clarkson, Ogden near 9th. There might be three, five or six instances; does not just know. Looked up data hurriedly. Remembers one or two where it was necessary to work the engine; buildings over two stories.

One was on Clarkson; both were cases where the fire was much advanced on the arrival of the department. Would not have been advisable to use the engine if pressure had been as great as pressure in the city. Thinks it was between 12th and 13th on Clarkson. Has not the date of the fire; it was before December, 1913; would not say whether it was fall or winter.

Has testified to all the fires within 17 months where it was necessary to use engines. When engine was connected up, had no difficulty and plenty of water in any case. Knows that engines are used for fire-extinguishing purposes in other cities besides Denver.

Redirect examination of Mr. Lieberman:

Does not think there were a dozen more fires where the engine was used; perhaps half a dozen.

HARRY WHITEHOUSE, a witness for the defendants.

Direct examination by Mr. Lieberman:

Superintendent of water and sewer work for city and county of Denver; also constructed work outside the state; not in the
853 employ of the city and county of Denver. Had occasion in past to examine some water mains of The Denver Union Water Company in the fall of 1912, at 22nd and Lowell Boulevard. Was superintendent of consrtuction work for Mr. Gibbons on line that was to run up 22nd Avenue and turn at right angles on Lowell Boulevard, and go out Lowell Boulevard. At that point ran into a main, with water conditions that interrupted work; had to change the line.

Between Julian and Lowell were digging a sewer; making progress of 200 feet a day; there was no water there; the dirt was just about moist; when we got to Lowell Boulevard and turned around, set ditching machine in, and started to go out Lowell Boulevard, and in less than six feet from the surface ran into large quantities of water; ground was saturated; water company was doing no work there at that time. When ditching machine was sunk in ground, exposed about three feet of the wooden main; seemed to be of a very advanced age. It was leaking a great deal. The bands were rusty and rotten, and also the wood. Water was coming out of each and every individual joint. That was last part of 1912. Has not run into the mains in any other part of the city, except once in awhile just a short strip in crossing them.

Found no leakage in other places, no more than natural seepage around some joints.

Cross-examination by Mr. Dorsey:

Witness asked how he knew that all the water found at 22nd and Lowell came from the wood-stave conduits; said the condition of the ground up to that point was dry, and were only using braces every 10 or 12 feet, but allowed to put in 60 feet before the city engineer came out and stopped them and changed the sewer down one block; when turned corner and started sinking the ditch, tie-sheeted and cribbed it; and when he moved down a block from that point, didn't have to sheet again; just went along putting it in at the rate of three or four hundred feet a day, against four or five feet a day at the wet place; so there was water at Lowell Boulevard and not at other places.

Found that there was a feeder pipe running from catch basin; heard the water running in there; found it was running from the big water main in the street. From those facts draws the conclusion that all the water came from a leak in the wood-stave pipe; understood the pipe came somewhere from Marston lake along Boulevard F. Delivers water in the reservoir on the north side; several miles in length.

If it was leaking like that everywhere along the line, would
854 not much water get to the lower end of the pipe; would depend upon how much pressure there was; water was coming out between each and every pair of staves. Wood pipe in that condition is not leaking so terribly much until the dirt pressure around it is removed. That pressure helps to hold the pipe in place and supports the bands. When the dirt is taken away it relieves a lot of the pressure. Thinks taking away the dirt in that particular place increased the leakage. Saw about three feet of the pipe; just crossed over it; does not know anything about the condition of the pipe anywhere but at those three feet. Trenching machine is a big wheel with buckets on the end of it, operated by steam; it is a traction machine; did not run the trenching machine into the pipe; pipe was uncovered by a caving away of ground. Trenching machine could dig 13½ feet, and did not get down over five feet until the machine would not turn, because of the mud; tried three times, and then let it stand idle; started to dig by hand. Encountered the pipe while digging by hand. Has placed several miles of wood-stave conduits. The kind of pipe is commonly used for that purpose in the western country.

Redirect examination by Mr. Lieberman:

Met the condition at three places 20 feet apart.

ANDREW ANDERSON, a witness for the defendants.

Direct examination by Mr. Lieberman.

Janitor at 322 E. 17th Ave., Kensington Apartments. Resided there 14 months. Visits all portions of the building. Have some tenants on the top floor, who have telephoned many times wanting to know why they could not get water on the third floor. Once or twice telephoned from the second floor. Nothing wrong with the plumbing in the house. This happened last winter; last spring, often, but not since the middle of the summer.

Cross-examination by Mr. Dorsey:

Has not had any trouble since the middle of the summer, when there was difficulty getting water for irrigation purposes. Never heard of any trouble since then. Three floors and basement in the Kensington. No trouble in the basement. There is not pressure enough for the third floor. Brings a little stream, but it takes a half hour to get a two or three-gallon pail; complaints come mostly in the forenoon before nine o'clock; some people are irrigating about that time.

855 Redirect examination by Mr. Lieberman:

Never got any complaints in the middle of the day. Does not remember; mostly around nine o'clock.

E. E. PATRICK, a witness for the defendants.

Direct examination by Mr. Lieberman:

Assistant chief of fire department about two years; been in the department about 23 years; has the northern district; everything north and west of the Platte river, from Broadway to 8th avenue; attends all fires, except every 6th day when he is off duty.

Has had difficulty with the pressure. Had trouble at 44th and Umatilla; a little pressure, but not enough to cope with the fire; a little corrugated iron barn was on fire; not very good stream; could get water, but could not throw the water more than 10 or 15 feet; that was about September or October of 1913. Had the hose connected directly to the plug. Had greenhouse fire at 35th and Wolff; fire in the engine room, one story; boiler in the basement; got a very poor stream; would throw 15 to 20 feet with three-quarter-inch tip; not very much pressure; probably 25 or 30 pounds. Headquarters 26th and Boulevard F; travels in automobile; has an engine city service truck and hose wagon. Has a hose wagon at engine 17 and engine 7. Just one engine in the district. Engine has territory in which it answers every alarm; that is not the entire district. If another engine is needed, is called from the nearest station; three fire houses in the district; part of the district served by wagons from other districts.

Has attended two or three hundred fires during the time he has been assistant chief. During that time pressume has been fairly good in some places and others it has been bad. Trouble has been in certain localities.

Do not get pressure in bad districts without an engine; in good districts has good pressure all the time; taking everything from Federal Boulevard out to county line and as far south as 8th Avenue; above Federal Boulevard the pressure is very poor, and the engine goes there. It don't go below Colfax avenue without a special call.

Bad district around Berkley, 36th and 38th Avenue, out to county line; engine district is practically all the same; south of Colfax Avenue don't get much pressure.

856 Cross-examination by Mr. Dorsey:

District lies entirely on the north and west of the Platte river; extends to the river; 8th Avenue is the south boundary line, and the county line is on the north; takes in Argo, but not Globeville. In all that district there are three fire stations and one fire engine. That is not enough fire engines and stations for district of that size.

Pressure is poor around Berkeley, and is poor from the district from Federal Boulevard west and north, when indicated east and west boundary line. It is rather high ground; does not know who owns the distribution pipes in district indicated. Put out lots of fires without an engine, but needs engine for a big fire. Engine goes to most of the places indicated, except east of Colfax Avenue; always managed there without; it is thinly settled and scattered out a good deal.

Thinks he has to use the engine three or four times. Other chiefs have had to use them on witness' day off. Possibly, if witness looked over the books, he could find more instances of using the engine.

Could not say whether it was necessary for the other chiefs to use the engine. Out of the three or four occasions when the engine was used, there was one when there was failure of water. Had to lay out a line of hose, and the main seemed to be small, and the suction would collapse. That was at 46th and Bryant. Does not think Chief Healy attended that fire. Thinks the hydrant used was at 46th and Bryant. That was not one of the instances mentioned on direct examination. Must have been a small sized main, because the suction would collapse. At 35th and Wolff could not get the engine there on account of the storm; managed to save the flowers.

At 44th and Umatilla kept fire from spreading, but the shed burned. 35th and Wolff was out near the city limits. The other place was 46th and Bryant, at the outer limits of the water system. The hydrant at 46th and Bryant is the last hyrant in that direction. At 46th and Bryant had out 1,950 feet of hose; at 44th and Umatilla had 250 feet of hose, possibly 300; at 35th and Wolff put out 250 feet of hose.

Redirect examination by Mr. Lieberman:

Witness' testimony is the result of experience.

857 N. E. RUMERY, a witness for the defendants.

Direct-examination by Mr. Lieberman:

Occupation, mining; resides 1912 Logan; owns the property; double house, eight rooms on each side; lives on one side; has had difficulty with water. When irrigating there is no water on the second floor; on the other side there is no water on the second floor when drawing water in the basement.

(Statement as to what other people living in the house have complained of was objected to and ruled out.)

Since February last there has been trouble on both sides; trouble at the present time.

Cross-examination by Mr. Dorsey:

Owns the entire building. Bought the house in January, 1908; does not know when it was built; is the old George E. Ross-Lewin place; diffculty on second floor occurs during irrigation time or when drawing water in basement; in winter as well as summer. There is three-fourths-inch pipe inside. Does not know the size of pipe from the main to the street. Three-quarters-inch riser, lead pipe. One pipe comes into each side. Is sure there are two connections to the main. Does not know the size of either of them.

Four taps in basement, all together; hot and cold for the laundry tubs; water closet in basement; two taps on the first floor in the kitchen; no running water in the butler's pantry; when drawing water in the kitchen it will just barely run out of the faucet on the

upper floor; when drawing water in the laundry it will not run at all on the upper floor. Pipes were examined by a plumber about two years ago. Does not know what was done. On the second floor there were two taps in the bathroom and two in the wash basin and water closet; there is no third floor.

Both sides of the double house are occupied in the same manner. Talked to man who came around and turned water on. He said witness was on a side street. Whenever a house is vacated, water is shut off; turned the water on in January on one side of the house and turned it on on the other side when witness moved in. The Gallup Rental Agency attends to house; has spoken to no one except the man who turned the water on.

Redirect examination by Mr. Lieberman:

Witness complained to representative of the company about pressure.

858 (Objection to testimony and to representative's statement overruled.)

Witness said to representative that the valve was not wide open. Representative said "You are not on the main line." "The main line runs on 19th." He said "that is the reason you don't get the pressure."

J. S. WHITESIDE, a witness for the defendants.

Direct-examination by Mr. Lieberman:

1625 Clarkson; janitor of the building; six apartments; three stories; half basement.

Has been on the premises for six months; have not been entirely out of water. There has been times when the pressure was weak; could not get water for the lawn and house at the same time; it would run in the house, but it was weak; had trouble just this last summer; not all the way around.

Cross-examination by Mr. Dorsey:

Shortage was during irrigation season. Could not say definitely what date; thinks it was July and August in the mornings; didn't have the trouble every morning.

It seems as though the hose was taking all the water that was coming. There was a weak pressure on the lower floor; cannot say what it was on the upper floor, for the tenant was away. When the hose was shut off the pressure was better. Pressure was as good in the summer as it is now. It would be a little better after irrigation hours; runs very slowly on the lower floor. Get plenty of water, but the pressure is too weak. House is 30 feet wide and two apartments on each floor; it is not a very large building; constructed seven or eight years ago; does not know about the size pipe which leads from the main in the street to the building; don't know how many faucets there are on a floor; two openings for irrigating the lawn; one on the side of the building and one in front, located on the side

of the building; part of the time operates them both at once. Don't know whether they are both on one pipe. Does not read the newspapers. Never complained to the Denver Union Water Company. Does not know whether the difficulty of last summer was at the time certain repairs were being made.

859 MICHAEL MCGOVERN, a witness for the defendants.

Direct examination by Mr. Lieberman:

530 E. 19th Avenue; resided there about 17 years; have had difficulty with water pressure; one tap for six houses; eight rooms and bath in each house; two stories. When irrigating on the outside very often would only get water in the kitchen, and none at all upstairs. Has such trouble all the time when irrigating; would get some water when not irrigating, but not the pressure he ought to have. When drawing water on the lower floor any time, cannot get it on the upper floor.

Cross-examination by Mr. Dorsey:

There is one pipe that leads from the main in the street, in the center, and then branches off on each side. Can't say what is the size of the tap. Pipe from the main to the branches extends across the street, to some point on the lawn in front of the center of the terrace, a few feet inside of the curb, where it divides into six branches. Understands that there is an ordinance regulation which requires pipe of a certain size from the tap to the stop box. Does not know exactly the size of the pipe in this particular case.

There is only one place to water all the lawns from; that is located 15 feet from the end line from one of the branches on the corner of 19th Avenue. Don't remember the size of risers. No taps in basement; two taps on first floor in the kitchen. Bath tub, wash basin, water closet, on the second floor. Witness and brother lived together in one house and rent the other five. Built the property 16 or 17 years ago. Made complaint to Mr. Maloney and Mr. Robinson of the water company. Took witness' brother to basement of water company office, showed the pressure gauge. That was about three years ago. They sent a man up to the house; he tested the pressure himself and did nothing; pressure was tested at the irrigation tap at the end of a pipe extending about 60 feet from the branch point; did not test at any other place; difficulty occurs during irrigation season, and sometimes when not irrigating. Any time when drawing water in the kitchen, gets no water on the second floor, either summer or winter; sometimes might get a little; no pressure on the second floor when drawing water in the kitchen; had no irrigation there until about three years ago.

Trouble occurs principally when irrigating outside. Don't have the pressure he ought to have.

(Witness asked if he read Denver Express, and objection sustained.)

860 THOMAS McGOVERN, a witness for the defendants.

Direct examination by Mr. Lieberman:

Brother of Michael McGovern; resides 530 E. 19th Ave. Had some difficulty getting water during time of irrigation season, and at some other times; has difficulty getting water on the second floor when drawing on the first, and has very little if any water at that time.

Built terrace 16 or 17 years ago. Five-eighths tap, three-quarter inch pipe; five-eighths inch pipe leading into each house; up to second story it is a half-inch pipe. Water company made the connection with the main and inserted tap. Plumber made the application.

Cross-examination by Mr. Dorsey:

Thinks tap is not large enough. Does not think that three-quarter inch tap will be all right. Thinks whole trouble is with the pressure. That the size of pipe would not make a difference. There is five-eighths tap in the main. Leading from that main onto the property is a three-quarter inch pipe. After that pipe reaches the property, divides into six pipes, five eighths or three-quarter inch in diameter. Inside of the house it is half inch to the second story; the five-eighths or three-quarter inch pipe runs along in front of the house, and there is a connection from that pipe to each one of the houses. The house occupied by witness would be at the very end of the three-quarter inch pipe. The tap for irrigating lawn is connected with three-quarter inch pipe inside the house, and runs out through the wall of the house on the corner, and irrigates all the lawns from that tap. The trouble with pressure affects all the houses. All the tenants claim they cannot draw water on the second floor when the water is running downstairs. Two taps, hot and cold water, downstairs, two taps at the bath tub, hot and cold water; two in the wash basin, and water closet; same number in each one of six houses.

CHARLES P. ALLEN, a witness for the defendants.

Direct examination by Mr. Lieberman:

Engineering, contracting; specialized in water works; about 45 years. Has made tests of water pressures in the city and county of Denver, for the Denver Public Utilities Commission; made them several months ago. Exhibit 50 produced and marked. Represents the pressures taken at Wolfe Hall. Three sheets marked Exhibit 50-*a*, 50-*b* and 50-*c*, respectively.

861 Exhibit 50-*a* represents pressure taken on June 21st to June 23rd at Wolfe Hall, between 13th and 14th on Clarkson. They were made in the boiler room of the heating plant with a Bristol recording gauge, on pipe coming in from the street main. The Bristol recording gauge is furnished with a paper chart, on which is a record showing hours of the day and the lines of the

pressure. An arm on the gauge, regulated by the pressure, makes the record, automatically in ink; is a standard method of making water records. Has had various experience with automatic instruments in past twenty years.

Reads the record shown on Exhibit 50-*a*, *b* and c, Exhibits 51-*a* to 51-*z*, marked for identification.

Exhibits 51-*a* to 51-*z* represent pressures taken at engine house 8 at 1681 Marion, on the fire hydrant immediately in front of the station. Tests were made in the same way as Wolfe Hall tests. Describes Exhibits 51-*a* to 51-*z*, giving times when records were taken by day and hour, and the reading of the record. This description proceeds on 3301-2. Papers marked for identification Exhibits 52-*a*, 52-*b* and 52-*c*, which represent pressures taken at Broadway and Center St., engine 13, at the fire hydrant in front of the house. Describes the exhibit. Continues description of Exhibits 52-*a*, 52-*b* and 52-*c*. Exhibits 53-*a*, 53-*b* and 53-*c*, marked for identification, represent water pressures taken at Blake Street engine house between 18th and 19th, taken in the same way. Describes exhibits. Continues description of Exhibits 53-*a*, 53-*b* and 53-*c*.

Reads from Exhibit 51-*g*, 51-*h*, 51-*i*, 51-*j*, 51-*k*, 51-*l*, 51-*m*, 51-*n*, 51-*o*.

Reads from Exhibits 51-*p*, 51-*q*, 51-*r*, 51-*s*, 51-*t*, 51-*u*, 51-*v*, 51-*w*, 51-*x*, 51-*y*, 51-*z*. Average on Exhibit 51-*a* is 29.4 pounds; 51-*b*, 31.6 pounds; 51-*c*, 33.3 pounds; 51-*d*, 34.1 pounds; 51-*e*, 35.2 pounds; 51-*f*, 34.1 pounds. Exhibits 51-*a* to 51-*z*, 53-*a*, 53-*b*, 53-*c*, 52-*a*, 52-*b* and 52-*c*, and Exhibits 50 and 50-*a*, 50-*b* and 50-*c* introduced in evidence.

Cross-examination by Mr. Dorsey:

All the pressures were taken June and July, 1914. Remembers that water company had a break in the conduits in June and July. Does not recollect when the first break occurred. Don't remember the dates when permanent repairs were completed. Wolfe Hall is within a few blocks of where the upper and lower services separate, and Wolfe Hall is not far from the top of the gravity service; just above that pumping service begins.

The charts cover periods of 24 hours, running from one calendar day into another. Wolfe Hall chart was put in the boiler
862 house and heating plant away from the main building, about five or six feet above the surface of the ground. The averages given are the averages for the readings on each hour. The lowest pressure was minimum 19 pounds on June 19th to 20th, which would carry water a little over 40 feet. Wolfe Hall does not exceed 50 feet.

Pressure becomes greater as one proceeds from Wolf Hall towards town. The hydrant was at Marion and 16th; also used for sprinkling. Opening of the hydrant would affect the pressure. Got the average by adding up the pressures on each hour of the 24 and dividing it by 24. Minimum pressure was 15 pounds, except on June 26, on which there was a minimum pressure of 2 pounds

recorded; on which occasion the pressure fluctuated. Visited gauges once a day.

The foreman at the fire house had a key to the box in which the gauge was locked. Gauges have bleed cocks which anybody can open, and when opened they do not register. Leaving out the low pressure of two pounds, the average was in excess of thirty pounds, and a good part of the time was in excess of 35 pounds.

With regards to tests at Broadway and Center St., there were a large number of readings taken which were not introduced in evidence. Those taken average close to those omitted. Witness did not make the selection; does not know why three certain ones were picked out. Gauge was on a fire hydrant right close to the fire house. The Blake Street gauge was attached to a tap in the building, which is the same faucet used by the fireman for various purposes. The opening of any tap in the fire house would be reflected on the gauge. Quite a number of other measurements than those presented were taken. Does not know who selected the particular ones which were testified about. Got the average in the same way as on the other charts. Thinks a fair average can be gotten. Has not considered the sharp jumpings of the needle, but at the Marion St. house did consider the two-pound minimum.

Redirect examination by Mr. Lieberman:

Did not consider short thin lines breaking away from the general trend of the needle.

C. P. ALLEN, a witness for defendants, recalled.

Direct examination by Mr. Nye:

Was at one time engineer for The Denver Union Water Company, for 27 years; member of the committee of engineers
863 appointed by the Public Utilities Commission. Made and filed a report to Public Utilities Commission in January, 1914. Witness' particular work was gathering various items and overseeing the estimates; estimates were made by different subcommittees and individuals.

Witness was suprintendent of the work. Consulted with the other members of the committee as to general policy and findings, and agreed with them. Approves and stands by Exhibit 19 and Exhibit 54, being the valuations checked and re-checked by Mr. Van Diest.

Cross-examination by Mr. Dorsey:

Heard a great part of the testimony of Mr. Van Diest and Mr. Fellows. Is willing to accept as his own the cross-examination and questions and answers propounded to Messrs. Van Diest and Fellows. Would have answered the same questions in the same way. With regard to the quantity of excavation at the Capitol Hill reservoir, engineers used the quantity given by the water company. Witness did not figure it. It was furnished either by Mr. Barnes or Mr. Hawes.

Either Mr. Barnes or Mr. Hawes gave excavation, waste material, embankment, lining, the under-drainage system and the pipeage in the reservoir. Does not know what quantities of excavation were taken and incorporated in the report. Witness began as engineer for The Denver Union Water Company in 1875 with the old Denver City Water Company, and continued until 1902. Signed the first organization papers of the Citizens' Water Company; left the old Denver company and went over to the Citizens' at the time the Citizens' was organized.

Returned to the Denver Union Water Company when the Citizens' and Denver were consolidated, and from that time remained with The Denver Union Water Company until 1902, at all times as chief engineer. Had something to do with the construction of the earlier wood-stave conduits; devised and supervised their construction. Cheesman lake was in process of construction in 1902. Witness was fired from The Denver Union Water Company for doing what the president told him to. There was a misunderstanding between Mr. Cheesman and the witness. There was a lack of friendly relations for a few days. There was afterwards litigation with The Denver Union Water Company and the South Platte company over some stock that witness claimed to own. Litigation was pending over a great many years, until witness licked them. It was a personal affair which did not affect the other members of the company. At the time witness was fired, the company, acting through Mr.
864 Cheesman, blamed him for things that he did not feel himself responsible for.

Redirect examination by Mr. Nye:

Entertains no animosity towards the company now, nor at the time the appraisal was made. Undertook to give the company the best of it.

Recross-examination by Mr. Dorsey:

Whenever there was any question of doubt witness gave the company the best of it. If there was any doubt at all it was resolved in favor of the water company. Undertook to have the appraisement just right.

JOHN GAFFY, a witness for the defendants.

Direct examination by Mr. Stevens:

Has resided in Denver since 1890; is a general contractor; has been engaged in general contracting for himself about 24 years, and for others about 12 years; a great deal of witness' work is along line similar to water company work, such as excavation, building dams and reservoirs; has never laid much pipe, except several miles of sewer pipe; laying of sewer pipe is practically witness' sole occupation.

Has recently made an examination of the physical system of the water company for the purpose of fixing valuation upon physical plant; employed some time in July, 1914, and has been working

from that time up to the present; has made an estimate of what would be willing to reproduce the system of the water company for—made at the request of Mr. Hunter, Commissioner of Improvements; total cost would be $10,109,789; made written report to Mr. Hunter, embracing all the details.

Exhibit 57 and 58 produced. These exhibits are the reports of the witness to Mr. Hunter; there are about sixteen pages missing. The original estimate was based on the present city schedule of work, which is eight hours a day, for $2.50, as a minimum price for labor; witness has made another schedule, on a nine-hour basis, $2.25 a day, which makes a difference of one hundred and some odd thousand dollars; that estimate is in a complete copy which witness has, and the other copies of the exhibit are being corrected; in witness' own copy it is $137,000; that would be taken from the $10,109,000; the latter figure based on an 8-hour day, $2.50 minimum scale for common labor; does not change price for skilled
865 labor. Witness made examination in person and fixed prices or value of the work for the purpose of ascertaining what he, as a practical contractor, would be willing to reproduce the plant for of similar material and under as similar conditions as possible attending the construction of the plant.

Discussion between counsel relating to exhibits 57 and 58.

In compiling figures, in order to know what to figure from, the only thing witness had to use was Exhibit C; tried to keep the same relationship all the way through; compiled estimates upon the articles and quantities mentioned in Exhibit C. The reproduction value for Cheesman dam is $915,449, shown on page 11 of Exhibit 57; the items are all shown on pages 6 and 11.

Whenever the figures are in red they are the original figures that were in Exhibit C, and were not changed. Where the figures are in blue, they show a change. In Exhibit 57 the starred figures mean the same as red figures. In sub-division D, South Platte river division, found at pages 12 to 15, inclusive, the items are set forth as found in Exhibit C, and the valuations at which witness would be willing to reproduce the work are set forth correctly. Exhibit 58 are reference notes on items set forth in Exhibit 57.

Exhibit 58 explains but does not alter the estimates contained in Exhibit 57. Exhibit 58 contains the explanations which witness would give on the stand if testifying orally in relation to the various items there mentioned.

The first thing witness did was to make several trips up to Cheesman dam and make a thorough survey of the road up there and the dam site; allowed a certain amount of money for opening quarries, putting in diversion dams for the outlet of the water through the tunnels, and to get ready for excavation; that would be the preliminary work. The balance of it would be quarrying, getting tracks and machinery and everything installed, getting ready for the actual construction of the masonry; went into it very thoroughly; figured to build the dam in three years; thinks an additional year was added for preliminary work.

In comparison with the estimates in Exhibit C, changed barbed

wire to 75 cents per yard, the price of clearing to 50 cents per yard, changing the total cost of fencing, including clearing, from $5,891 to $6,468; raised the water company's estimate of constructing the road from $15,000 to $25,610. This increased estimate was made to build a first-class road for delivering material with motor trucks, reducing the maximum grade to not exceed fifteen per cent; $6,000 allowed as preliminary dam expense on account of road from Buffalo to Cheesman; total cost of the road would therefore be $31,-
866 610; period of maintenance reduced from seven years to four years; changed price of telephone lines from Buffalo to Cheesman, 18.2 miles, to $217 per mile; whenever found that water company's estimates were too low, raised them. There seems to be a difference of $1 on the total cost of construction of telephone line; raised the cost of clearing reservoir site $100. In Exhibit C there is an item headed "Preliminary dam expense" estimated at $84,748, but the details are not sufficient. Water company was requested to furnish details, but failed. Has allowed a reasonable amount for preliminary dam expense, including the $6,000 for preliminary road expenses referred to.

Preliminary survey and examination of dam site, $12,500; clearing dam site, $500; constructing temporary crib dam, $8,260; flood contingencies, $30,000; total, $57,260. This makes a difference between $84,748.00 and $57,260.00 in preliminary expense. Gives details of estimate cost of the diverting dam and total estimated cost is $8,260. Changing unit cost of excavation for dam and spillway, changes total cost from $35,621 to $29,710.

Discussion between counsel and master as to method of examining witness.

Has made no allowance for depreciation on account of age, or otherwise.

In making estimates figured the regular municipal scale of wages; $2.50 a day for eight hours for common labor; $5 for eight hours for teaming.

There is a letter to go into Exhibit 58, giving the basis on which these things should be figured in a private enterprise. The revised figures are approximate. The total is $132,243; that is by changing to $2.25 for 10 hours' work and $5 for teams on 10 hours' work. That has made the difference of $132,243 as against original estimate. The wages used for the revision are the current prices for common labor. After arriving at the basic figure for all the different works, added twelve per cent for contractor's profit; not always, but in most every case twelve per cent would be the cost of the entire division. Cast iron pipe in the city, added five per cent; Cheesman lake, fifteen per cent, because it is a trifle more hazardous than the other construction; harder to get men in from a railroad; handled at larger expenses; being away from the base of labor and supplies.

Exhibit 58 is now a complete report, with the addition of the pages of the details of the estimate and report to the Commissioner of Improvements.

Cross-examination by Mr. Dorsey:

Approaches the question from the point of view of a practical contractor, and undertakes to estimate the aggregate price
867 at which witness, as a practical contractor, would undertake, at the present time, to reproduce the structural part of the water plant; does not include rights of way or land, or the costs of acquiring these items of property in the plant; does not include anything on account of water rights, or any cost connected with the acquisition of them; confines himself strictly to the structures. Administration, legal expense, was figured in acquiring rights of way and things like that, but not figured on any cost of the right of way.

Referring to Exhibit 57, witness omitted pavement of Ashland Avenue reservoir estimated by Metcalf and Anderson, gross reproduction cost $49,425; omitted service taps; the extra cost of laying mains under parallel tracks and conduits, both of which were estimated in Metcalf and Anderson's estimate at $249,960. In a sense, omitted preliminary organization expenses, but made provision in the total to cover a good deal of it; not all of it. Witness' letter appearing on page 5 of Exhibit 57 is right in saying that the estimate does not include water rights, lands, rights of way or preliminary organization expenses. Does include all items of expense properly chargeable to the construction cost. Price at which witness, as a practical contractor, would undertake to produce the items of the plant and the cost mentioned is $10,109,789, as stated in summary on page 143 of Exhibit 57, and that is the sum which witness would expect to get from the water company employing him. The subtotal of $8,178,047 appearing on page 143 of Exhibit 57 is the actual cost of labor, material, plus the contractor's profits. Contractor's profit was figured at twelve per cent, applied to the total of labor and material on each class of structure except the installation of the cast iron pipe within the city limits, to which a percentage of five per cent was applied, and the Lake Cheesman construction, to which an item of fifteen per cent for material and labor is applied as contractor's profit.

There is some iron pipe in the conduit system to which the twelve per cent has been applied. There is some cast iron pipe and specials in the conduit system that has fifteen per cent profit, plus twenty per cent profit in addition to it, on account of the different places, but in a general way fifteen per cent, five per cent and twelve per cent cover the profits. The special instances referred to where profits, different from the ordinary profits given, were applied, are of relatively small importance. These profits are the ones which a contractor would ordinarily demand. Contractor would assume that after he had paid out everything he was required to pay, he would have in hand profit equal to these estimates.

868 Contractor aims to get his basis cost first. He sometimes errs. After getting the basic cost he aims to add profit to it. In the total of $10,109,789; contractor's bonds, administration, legal

expense and other like matters are included; that is the way witness takes care of them.

Thinks contingencies will be encountered in a work of this kind. On page 143 of Exhibit 57 witness has apparently included contractor's profit on all classes of structures, except buildings, before reaching the sub-total of $8,000,000 and some odd thousand dollars, and then added contractor's profit below on the assumption that the estimate of Willison and Walsh include contractor's profit, and that five per cent should be added for general contractor's profit. In arriving at the total cost, has assumed that contractor would be paid on the basis of thirty days' estimate upon the amount of work done the previous month, barring ten per cent retained.

Ten per cent generally covers the amount retained. Does not know what the statutes require. Has not taken the requirements of the statutes into consideration. Does not know that it provides that the ten per cent retained shall be permitted to accumulate and be held for thirty-five days after the completion of the work. Has made provision in the interest rate for paying half of the interest on the total for the entire time. The interest item is $607,479, on page 143 of Exhibit 57; assumed a year to construct the distribution system, and a year and a half on the dam and supply line. Interest periods are arrived at in the following way: Figured the working days 22 days a month, between 7 and 9 months a year; distribution system figured on 9 months a year and the dam 7 months. The interest is figured on that basis on the time that would be occupied in installing everything from C down to S. Total time would be three years on the dam and two years on the distribution.

Have allowed 90 days for preliminary work on the dam. Would start that before starting the work downtown. Figured on starting the dam a year ahead of the distribution system, and having the interest period expire on both of them at the same time; use six per cent; witness borrows money at that rate. A contractor would also have costs for administration and office expense at Denver, office force, transportation of superintendents, engineering expense, and so forth, which is covered on page 143 of the exhibit.

Under item of administration and legal expenses, $200,000; engineering and supervision, $429,942. Any contractor would be subjected to such expenses. Would also have a cost for testing material, one per cent, appearing on page 143 of Exhibit
869 57. Would not buy the material without its being inspected and tested, and someone would have to do it. The basis of witness' estimate is that the contractor buys the material and furnishes it. The chances are the contractor would not do the engineering, but provision is made for it. If the city did it, the contract would cost them so much less. According to witness' estimate, the actual construction would cost $8,178,047, and other incidental costs added to it in addition. To that has been added about $2,000,000, and the total covers the overhead costs or charges to which the company or the city would be subjected, and any other expenses the city or company would be put to would not alter the contract price of $8,178,047. The incidentals of $408,902 the city would have to

provide for. The contract would provide for the construction of the plant for $8,178,047. The money for contingencies would not be used unless it was needed, and is then to be paid to the contractor to meet his contingencies. Has made the figures in case the contingencies arise. The total of $8,596,846 refers to the contract price, contractor's incidentals, contingencies and contractor's profit on the construction. The item of $90,797, in Exhibit 57, page 143, covers bonds that the contractor would have to give the city or the water company, and would be the premium therefor, and it is figured as part of the cost, the contractor pays his own bond, and adds it to the contract price when he makes the bid.

The cost of testing and inspecting material would not be added to the bid. That is an item that the city or corporation would have to pay, and would be the same as the engineering. The item on page 143 of Exhibit 57, referring to engineering and supervision, and totalling $429,342, is the amount that would have to be paid for engineering. If the contractor did it, he would have to be paid that much. If the city or corporation did it, there would be that much expense to it.

The contractor's own engineering expenses are taken care of out of his profit and overhead expense. The cost of an engineer is included in the item of estimated cost on page 148, and is in the sum to which the contractor's profits were applied. Thinks about one and one-eighth per cent actual cost is included in the twelve per cent contractor's profit. That is the only allowance made to cover the overhead expense to which the contractor may be put. In Exhibit 58 has not given detailed distribution of the one and one-eighth per cent. None of it was for contractor's engineering. To give the details, would be running down so small that it would be hard to adjust each item. There would have to be headquarters, an
870 office in Denver, and bookkeepers, auditors, paymasters, superintendent, and various employes. This is taken care of by the one and one-eighth per cent, which is ample to take care of the whole thing. Had previously stated that he had figured out the various costs and arrived at one and one-eighth, but has destroyed the figures.

Never executed a contract involving ten million dollars. Would not keep his own engineer, and does not think it is necessary. Gives no figures for the cost of headquarters and administration, but insists that one and one-eighth per cent would take care of it. Does not take care of contractor's contingencies. Has provided for that in five per cent allowance. One and one-eighth per cent does not cover interest during construction. Would have to provide considerable funds at the outset and keep a good deal of contractor's money invested throughout the performance of the work. Interest would have to be paid on that. That interest is included in the item of six hundred and some odd thousand dollars. The chances are the contractor would have to pay all the interest during construction. If he took bonds, the coupons would be cut off, or it would be necessary to pay accrued interest up to the time of taking the bonds.

Imagines that contractor would have to take city bonds delivered

in installments with the coupons cut off. Would make no difference whether paid in money or bonds. Would rather be paid in bonds. If working for a private corporation would expect to be paid in money. The $600,000 item covers the interest which would have to be paid by the contractor, who would be paid for his work in installments every thirty days. When the company pays the contractor, the company is out that much money and has it actually invested, and would be getting no interest on it until the plant was completed, and would therefore be subjected to a large interest-during-construction charge. When the contractor is carrying the company for thirty days, he is paying interest. When the company pays him, they pay interest, and witness figured that the item of $607,479 covered interest paid by both company and contractor.

Did not separate the company's interest and the contractor's interest. Somebody would be paying interest on the whole amount for half of the contractor's construction period. Interest during construction would not cease on each structure as soon as completed, but would continue until the time that the system was in operation. Manifestly, in arriving at figure at which any contractor would be willing to contract to reproduce the plant, there must be added to the sum of $8,178,047, the incidentals and contingencies and
871 profits of the contractor, cost of bonding, interest during construction, or liability insurance.

$10,109,789 is the figure at which the witness would build the whole plant himself and turn it over to the city. If the city had its own engineer, superintendence and overseeing of the job, the contractor would not need to spend so much money. Does not think the contractor would need an engineer if the city did it. Has been on a job amounting to two or three million dollars where there was no engineer. Has never seen a double set of engineers complete upon any job. Has seen a few inspectors; has never been on a ten million dollar job. Most of the witness' contracts have been with cities and towns, and the major part with the city of Denver. The largest of these was for about a half million dollars. In contract with the city, has employed the service of engineers especially in making estimates.

Has had assistance in making estimates before making bids, but believes he has not done it on five per cent of all the work done. It is not always the larger contracts that are difficult to carry out. Exhibit 57, page 143, the item of liability and public insurance, $96,737, is for protection against employes and the public. That would be a cost of construction to be borne by the contractor.

The $200,000 legal expense is put there for anybody who has to use it.

If witness was making contract with The Denver Union Water Company, and the company had prepared its specifications, witness would not include anything in his bid on account of administration and legal expense. There would be nothing out of the ordinary in getting up the contracts.

Administration expense, supervision, headquarters, etc., would not be incurred by the contractor. The cost which the contractor would be put to for superintendents, foremen, headquarters cost,

office, bookkeeper, auditor, telephone, would go into the one and one-eighth per cent which goes to make up the twelve per cent.

Witness was asked to take the figures as they appear on page 143 of his exhibit, and figure out what his bid would be and what he would expect to get as a contractor if the water company at this time were about to reproduce these structures, and had itself prepared the necessary plans and specifications, and had offered to competitive bidding a contract for the reproduction of the work in accordance with the plans and specifications and set out separately in his figures what is included in total bid in addition to basic figures of $8,178,047, on account of each item there referred to, including interest during construction. Has not included Classes A,
872 B and T, shown on Exhibit C. The witness compares his estimate of $8,178,047 with the Anderson and Metcalfe estimate of $9,413,049.

In order to make a fair comparison it is necessary to include the Ashland Avenue reservoir lining, service connections and the additional cost of reproduction where the mains parallel the railroad tracks or the street car tracks.

Mr. Hunter's instructions were not to use the figures on the connections or on the parallel lines.

Witness always took the quantities estimated in Exhibit C. Says offhand that Lehow lake infiltration and intake, and in the tops of both Capitol Hill and Ashland Avenue reservoirs, and in the Bear Lake pipe lines, were calculated to different quantities, but Lehow lake infiltration means infiltration galleries at Platte Canon. These quantities refer to excavation in some instances and lumber in others. Witness gave credit for 20,000 feet of lumber more than called for in Exhibit C, and as to quantities thinks there was a mistake in measuring.

These are the major differences in quantities. In all items has made determination of and applied own practices, which differ from those of Metcalfe and Anderson in many cases.

The figures set forth in Exhibit 57 in the various classes are the totals estimated by the witness without the addition of any overhead sub-contractor's profit, which was added at the various rates mentioned. The architect who estimated the buildings added a sub-contractor's profit, and witness added a principal contractor's profit of five per cent. There is a large amount of cement used in the construction of the water works plant. Could not get specifications for anything except the Cheesman dam, and so estimated his own mix, which appears on page 14 of Exhibit 58. Estimated price, $1.62 for the cement for the whole job, to which freight and cartage was added; 20 cents per ton-mile added in all cases, except Cheesman, and that is 23 cents. On Cheesman lake took the quantities from the inventory: 86,000 barrels at Lake Cheesman and a great deal more at the other structures.

The cost of handling cement was estimated on a basis of unloading from the cars into the warehouse, from the warehouse onto the wagon, taking it from the wagon and unloading it on the dam. Would have a small warehouse, but haul a great deal of it right out of the cars to the works. Corrugated warehouse for 8000 bar-

rels would not cover over $1000. Would not have all the cement on the job at once. Would come in carload lots. Would keep two or three thousand barrels on hand for washout or breakdown, or any delay.

Witness would test cement at the plant. Don't examine the cement when it has been tested at the plant. If not, it is covered by the one per cent inspection charge. If any cement was
873 delivered that did not pass inspection, would charge the cost to the cement company. Cement in large quantities is always inspected at the plant, and every car number is taken. Never has performed a contract requiring such large quantities of cement, but has used a great many thousand barrels of cement a season, and has used it where it is inspected at the plant right along.

There will be 35,000 barrels in the Larimer St. viaduct; that is being inspected in Denver when it arrives from the plant, but that is not usual. But the item for field and shop inspection would take care of any such costs. Contractor would be satisfied to accept the factory inspection.

In a great many cases it is provided that a warehouse shall be kept wherein the cement may be inspected so as to give a thirty-day test. Does not impose a very great cost on contractor; cost would not be very great. Can keep the cement 30 or 60 days in the bins at the plant, and witness so assumed in this case. If not inspected at the plant, the cost of inspection in Denver would not be very much, but allowance of one per cent for inspection made by witness would cover it.

On a basis of 240 yards a day, there would be 200 barrels of cement; in thirty days there would be 6000 barrels of cement, if the whole cement was carried thirty days in stock. This would be on Cheesman lake alone. Witness' figures are ample to cover the cement proposition any way you take it.

Witness states: "The only man's judgment that enters into this is mine. If this estimate is right, I am right; if I am wrong, the whole estimate is wrong, because there is nobody else's judgment there but mine. If I was figuring on this job tomorrow I would use my judgment, the same as I have used it here. Consequently, if I made a mistake on this and figured it too low, I am the loser; if I have a fair profit, I am the gainer. This is my estimate and my way of handling the proposition."

Witness' allowance of one per cent, specified on page 143 of Exhibit 57, and there designated as an allowance for testing material, and so forth, includes the cost of handling the cement. Nothing more need be added.

The cost of the cement, allowing $1.62 for the cement, 60 cents for handling, which is 12 cents; freight to Buffalo, 14 cents; hauling 24 cents, is 94 cents, making a total of $3.25, to which has been added a profit of 39 cents a barrel. If all the money to handle the cement is borrowed at 6 per cent per year, the interest is 19½ cents, and there is 39 cents for handling the barrel of cement in addition to the actual cost. There is not an item of risk involved.
874 Would not allow anything to cover the item. It is already there. It is in that one per cent, $85,988.

Is asked how much there is in that one per cent on that account. Answers, whatever it would pro rate at. The contractor would not pay any of the one per cent. It appears from the witness' testimony that the cost of handling the cement to the contractor is not in his estimate of cost, but he says it is in a one per cent allowance for inspection, and so forth, and the cost that the company would be put to for handling the cement is nowhere set down as an item of cost, but is in the one per cent.

Exhibit 57, Class F, page 27, item 5, sub-item A, are the Platte Canon infiltration galleries; is one of the instances where the quantities did not agree with Metcalfe and Anderson. That item does not cover any excavation or backfilling of the excavation, merely piping itself and the placing of it, 4,111 feet at 95 cents, total $3,905. The item of crib, 3,912 lineal feet, and so forth, amounting to $4,172, does not include excavation. The item of excavation, 12,000 cubic yards at $2.10 per cubic yard, amounting to $25,200, covers cost of excavating trench for the crib, and the item on page 28 of Exhibit 57 for backfilling, 12,000 cubic yards, $1,200, relates to the backfilling of the excavation for the crib.

There is no allowance for the excavation for the 24-inch perforated pipe. Class J in Exhibit 57, page 58 thereof, shows the difference between Metcalfe and Anderson and the witness on that class to be $18,000, of which $12,930 appears to be a difference in estimate upon the Littleton mill building, which was estimated by Willison and Walsh.

The item of transportation enters largely into the estimate. Figured on doing most of the hauling by motor trucks, and very little by wagons. Figures on the transportation of material for Lake Cheesman as 23.8 per ton-mile, as it is on page 10, item 6-E, Exhibit 58; and on page 97 of Exhibit 58 cost of 20 cents per ton-mile is arrived at for haulage in the city, and everywhere else except Lake Cheesman. Has never made use of motor trucks.

Got information from truck owners in Denver and Portland, Oregon. Can haul the stuff by wagon for the same figures. Hauling by wagon on the eight-hour basis would be 33 1-3 per ton-mile, but on ten-hour basis would change the proposition. Could not haul cement for 20 cents per ton-mile with a wagon on eight-hour day, but could be done with a truck. Would have to make roads from Buffalo to Cheesman.

Truck owners in Denver have guaranteed to do certain loads,
hauls and hills. Witness has had no experience at Portland.
875 Was assisted by Mr. Frank Kelsey of Portland. Got Portland information by letter. Trucks are not used here at all, hardly. Don't recollect who the Portland informant was. Thinks it was a contractor. There is not a town in the country half as big as Denver that don't use a hundred times more trucks.

Witness has an automobile and finds it expensive. All automobiles are not what the agents say they will be. Only knows of one or two trucks that have been used, and they not very generally. Other contractors over the country are surprised we are not using them here. They are using them on fifteen per cent grades and hauling five tons with them in Portland. There has been no real

experience in Denver on the use of trucks. Knows one five-ton truck here that is hauling crushed rock over good roads, would not be afraid to take a gamble on it.

The altitude has some effect, but can be met by adjustment of carburetors, condition of roads affects the use of trucks. Roads are pretty good. All the roads in Denver are safe for truck work. The routes would be changed. Could not go anywhere with a team that trucks would not work. The majority haul would be along main travelled roads. The wheels of the trucks are twelve inches wide. Knows that a very large per cent of the total conduit length is along private roads. Storms interrupt motor-truck transportation.

Does not know the cost of trucks. Allows 12 minutes for unloading and 12 minutes for loading the truck. This can be done. Five-ton load would equal 38 four-inch pipes; 26 six-inch pipe, 19 ten-inch pipe, 11 twelve-inch pipe. Figured on loading and unloading such pipe with movable derricks attached to the truck.

Expects to get a five-ton truck with a movable derrick for $4,900. Loading apparatus adds $400, and would be stationary in the yard all the time. The unloading apparatus would be attched to the truck, and would be a sort of a crane which would lift two or three pipes, and drop them on the ground. Would operate it by hand power. Knows that he can handle the pipe, unload it and distribute it for 20 cents per ton-mile. Could haul it for $1.20. Has never hauled with trucks, but has done like hauling. On the 6-inch pipe would have to stop twelve or thirteen times, and throw off a length of pipe at each stop; possibly the same for the 10-inch pipe. On the twelve-inch pipe would make eleven stops. Thinks five per cent of all the pipe is 6 inches and under, and 86 per cent is 12 inches and under, so that on 86 per cent of the pipe that would be distributed there would be fifteen to nineteen stops. Don't
876 think anyone will make such an average on this job, but thinks it can be done. Estimated an average speed of eight miles an hour.

Counsel read from the proceedings of the 14th Annual Convention of the American Transfer Men's Association, held in Detroit, June 16, 1914, in which the maximum speed for five-ton trucks was said to be 7 miles. Witness charged his downtown trucks off in two years and mountain trucks in three years; is not a truck expert, but if the trucks would not make eight miles an hour they would not be any better than teams.

Witness' attention called to page 97 of Exhibit 58, where the trucks were assumed to be written off in three years. The efficiency of gasoline was arrived at from the same source of information. Figures two and a half miles in the mountains and four miles in Denver. The truck pulls by chains. Knows that he can haul by teams for the money estimated on the truck basis. Mr. Hunter does not want the figures except on the 8-hour basis and witness has made figures on that basis and got the trucks on account of the 8-hour day. Is satisfied he can do the hauling by teams for 20 cents a mile.

Witness will stand on the estimate for doing the hauling by trucks,

and bases the estimate on the information gathered by others. A two-horse team carrying a two-ton load a distance of ten miles would cost 40 cents per ton-mile. A team could haul at least 5 ton-miles and return unloaded, two miles an hour, on an eight-hour basis. If the load was two tons it would be 25 cents per ton-mile. Are hauling every day with teams making that speed. Estimates one set of tires per year. Got this data from the same source of information.

Did not investigate what the Denver Omnibus and Cab Company would have to pay for their light trucks on city paved streets. In figuring interest on the investment in trucks, figured it for two years, or total of six per cent.

In making an estimate on trucks, had the White truck in mind. Is satisfied ought to use total of 6 per cent interest on the trucks. Makes the same estimate per year for tires used at Lake Cheesman.

Divided the city into eight districts, in which the loaded railroad cars would be set for delivery of the freight. In order to do this it would only be necessary to put in one or more tracks on the Union Pacific at Kearney and 47th Avenue. The other seven are now available. One at Josephine on the Union Pacific; Colorado & Southern at Franklin and Mexico; one at Delaware and Virginia on the Colorado & Southern; one at West Tejon and Mulberry on the D. & R. G.; one on South Water and 7th on the C. & S.;
877 one at 45th and Gallepago on Colorado & Southern.

Thinks the railroads, on arrival in the city, would switch at various points without additional charge, whether they came in over their own line or some other railroad.

Does not know that there is a published tariff of 20 cents per ton for such service. Does not think the shipper would pay this charge. Has never had any trouble on shipments from outside the state; set where wanted. Thinks the railroad of original routing would certainly deliver freight anywhere in Denver. It is a fact that the Union Pacific delivers their routed material anywhere on their line. Did not take into account any extra cost for switching in Denver.

Referring to Exhibit 57, page 38, item 8-I, 48,780 cubic yards at $1.25, $60,975, and the subsequent item of 15,400 cubic yards at $1.25 per cubic yard, $19,250, figured the delivery of sand mentioned after washing and grading at the bank. Would then put it on a chute and send it down to the bed. Has never had any experience in constructing a slow-sand filter. It would have to be taken over the surface with wheelbarrows and distributed that way. It does not cost $1.25 to take out the sand and deliver it on the bank.

Witness' estimate in Exhibit 58, page 23, item H-I, allows 75 cents per cubic yard for the sand and gravel delivered; 25 cents for screening and 25 cents for washing, but it would not cost 25 cents to wash or screen it, and that estimate would cover putting it in place. Would require different size screens. It would be done in one operation. Has made the different sizes with one operation. Has never constructed a filter bed, but sees nothing out of the ordinary in the construction of it.

Witness' attention is called to his previous testimony and the statements in his exhibits with regard to the preparation of sand for the Platte Canon filters. Witness explains that 25 cents per cubic yard would cover the cost of washing and screening, which would be done at the same time, and that the further sum of 25 cents allowed would be sufficient to place the sand and gravel on the surface; that the estimate of 25 cents "for screening" should have read "for screening and washing"; this will be ample allowance for screening, washing and separating into four different sizes. Sand and gravel would be put into a revolving screen, with different meshes, and the water would be pumped into the screen while it was in operation; the machine would be engine-driven; the 25-cent estimate covers cost of the machine.

Witness thinks operation of cleaning and separating could be done in the manner he has indicated; does not know of any case where it has been done that way; does not know that in
878 water works construction it has been found that it cannot be done that way. Cost of screening alone without washing would be from 15 to 18 cents; has washed sand and gravel for concrete purposes. The object of washing sand and gravel for any purpose is to eliminate the loam and other admixtures.

Don't know of anything that would be done with the sand except to wash it. Don't think there is any operation that will wash sand as thoroughly as revolving screen, with plenty of water. Witness thinks his washing operations have left two or three per cent of loam in the sand; that would be a clean material. If it had to be cleaner, that could be accomplished by adding more water. The item of trenching for the purpose of laying conduits and other apparatus and the item of backfilling after the apparatus is laid are very large and important items of the total cost. The work of trenching for conduit lines and backfilling the same differs somewhat from the city lines. Has adopted a standard price of 12½ cents per cubic yard for the excavation and 10 cents for the backfilling. Refers to Exhibit 57, page 23, Class E, item 5-C, steel pipe in place, and the item of excavation therefor, the allowance being 12½ cents per cubic yard. Compares same with Metcalfe and Anderson's estimate, Exhibit C, page 166, of 25 cents per cubic yard; backfilling, 10 cents per cubic yard, as compared with Metcalfe and Anderson's estimate of 14.6 cents per cubic yard.

Figures that in the construction of the conduits ten per cent of the work would be hand work and team work, and 90 per cent trenching; would use a No. 10 Austin machine, which would dig successfully 7 feet wide and 20 feet deep, if necessary; this is one of the largest machines they make. Operated by steam power; has a boom with a chain, and belt revolves around the boom; excavation buckets on the belt. Cost of No. 10 Austin machine with freight to Denver added is $11,700; adds no cost for transportation to the work. Estimates repairs on machine at $5 per day; does not have much breakage; has operated an Austin machine a great deal that would dig deeper, but not quite so wide, just as good a machine; dug a trench 48 inches wide and 22 feet deep, hard

ground. Some of them dig ten feet; 6 feet by 20 is the capacity of the No. 10 machine. Witness has never tried to dig a trench more than four feet wide. Operated the machine in question in Denver for nearly three years, and did six or seven miles of work with it. The chain belt is changed for the different sizes of trenches. The engine capacity is always strong enough to take care of the maximum. A No. 10 machine is guaranteed for a 6-foot trench; does not know that they have had trouble in maintaining that guarantee, or that that increases the cost; has had experience with
879 ditch 20 feet deep and 4 feet wide, which would be harder than a 6-foot trench six or seven feet wide. It is really the greater depth which makes greater difficulty. Where a ditch is shallower, have had no trouble extending the width.

Witness' experience is that the deeper one goes the harder the excavation is. Would rather dig a ditch averaging seven or eight feet in depth than one averaging 16 feet to 20 feet in depth and yielding the same yardage per lineal foot. Does not think that a smaller change in width will add proportionately more than a larger change in depth.

Put in a trench five feet wide for the Denver-Laramie Irrigation people—very hard ground; made about 1100 feet a day; it was for a 36-inch pipe; dug 37,000 or 40,000 feet; trench was 6½ feet deep. The price was something like 50 cents a foot for the excavation and backfilling, hauling pipe and putting it in place; did not include the cost of the pipe.

The ditch was a kind of a siphon from Church's ditch to the top of Westminster, and the work was done for the D. R. I. Company; made a little profit; the average haul of the pipe was about three miles; did the riveting as well as the laying. That is the only experience in operating trenching machines on a trench as wide as five feet. Has operated smaller trenches, from 24 inches up to 5 feet; don't know whether ever dug a 20-inch trench; dug a 4-foot trench about four years ago on the Washington Park storm sewer; there were several thousand feet of work on that storm sewer, different size trenches. Machine only dug six or seven feet deep; in some places had to dig deeper than that; did more than half of the work with machine—about fifty per cent of it. Had two different kinds of machines on the job; one was a Potter machine, for digging wide trenches for brick sewers; they are more of a conveyor; the material is loaded onto the Potter machine by hand; some of the trench had to be 8 feet wide, and did not use machine on that; cannot tell the cost on the Washington sewer job; so many changes are made in sewer construction, but on conduit construction would dig practically the same size for several miles; obstructions in the streets do not bother so much for sewer work; would use the trenching machines between obstructions—just raise the machine over the obstruction, excavating to the depth of the pipe while going over; it does not delay the machine, but involves a certain amount of cost in locating the pipe, but not in excavating. Figured on the salvage in the machine taking care of extraordinary

repairs; charged machine off entirely during the life; there is more or less repair work on the machine.

880 Five dollars a day will take care of everything except breakdowns, or something of that character. Breakdowns do not occur so much on new machinery. After an Austin No. 10 machine has been used for two years, there might be fifty per cent salvage—no question but what there would be 25 per cent; estimate is based on that assumption; has estimated the digging of distribution pipe trenches to some extent by machines; the details appear on page 103 of Exhibit 58, and assumes the use of a No. 1 Austin machine; trenches would be much narrower than the conduit trenches; the distribution pipe trenches would be 12 inches in excess of the size of pipe, and the main does not exceed 24-inch trench, or about one-third of the size that would be required for the conduits; made the same allowance of $5 a day for machine repairs; this would be possibly 60 per cent more than ample for it. Although the estimate is too large, simply left it at that figure. Wrote off both conduit machines and distribution pipe machine in two years. Thinks there would be more salvage in distribution pipe machine. Interest on investment in the trenching machines is figured on page 25 of Exhibit 58, at $1.60 per day. The interest is figured by the year, but divided by the working days. Recalculates and thinks that the $1.60 should be changed to $2.40 per day; estimates an average speed of 500 lineal feet, and feels confident that that can be done; has dug as high as 1100 feet per day. There is no machine that will not dig more than that average; there is no better digging than that out there any place; no trouble in making creek and river crossings; runs the machine on large timbers, and the caving is taken care of by putting in boards to hold the banks; the men with the machine will do that; there are four laborers with machine.

Allowing 10 per cent hand work at 25 cents per cubic yard, the total cost of incidentals would be one cent per cubic yard; never has used machines on work of such magnitude as involved in the estimates; there are people who have done a good deal of work in digging conduits of this kind; it will be found that such trenches are dug by machines.

Knows W. F. Allen; supposes he has done a great deal of work of this kind; did not hear his testimony; on the viaduct Mr. Allen bid $7 a yard, and witness bid $17; that is the only way can compare his judgment with Allen's—does not know of anybody's experience on trenches except his own.

Thinks the estimate of 12½ cents per cubic yard is ample; wishes he could get all he could do at that price. The contract price on heaviest railroad excavation runs from 9 to 18 cents per cubic yard; has seen it handled for 7 cents, on the Colorado & Southern, on the line from Walsenburg to Pueblo; Sheridan, of St. Joe, Mis-

881 souri, took the contracts; would not take a job at that price.

Witness' average figure on sewer work has been 25 to 35 cents per cubic yard; has not taken a sewer in three years; that figure includes the backfilling; no one would get a job here on deep-cut

sewer work on a basis of 80 cents to a dollar per cubic yard and two to three dollars for wet material and quicksand.

Has bid 25 cents per yard for excavation and backfilling of sewers and has not secured the job; that would mean about 25 cents for excavation. Sewers are deeper than the water works and some wider; cannot afford to equip for a small job as could for large job; thinks difference in equipment would cut the price in two; equipment would be large and expensive, but there is work to pay for it.

Witness knows that Mr. O'Gara had a machine to dig a trench and abandoned it; had a Parsons machine, and that is not the right kind; never knew anybody else to have a trenching machine and abandon it except O'Gara; figures that there is about ten per cent on the conduits that cannot be excavated by machines; made an examination by going over the ground, not personally, but at a distance; some places went over the road; examined the river crossings; made seven or eight trips; as a general thing, traveled along the road, and covered most of the line that way. Witness' standard estimate for backfilling is 10 cents per cubic yard, as against Metcalfe & Anderson's 14½ cents; both estimated on doing it by machinery.

There are two or three grades of machinery; can use steam shovels or go-devils; simply involves putting the earth back in the trench; don't think it makes any difference whether the backfilling is put in by hand or not, so long as it is put up to the spring line; would be no more necessary than in the case of backfilling a green brick sewer; that would not withstand the pressure as well as a wood pipe; it must be tamped carefully for a green brick sewer.

Figured on tamping it by layers, but it is not necessary to put it back by hand; would not have to add anything to the unit price of ten cents on account of tamping in layers of four to six inches in thickness; the average cost is nowhere near 6 cents; it would have to be tamped beyond the spring line, which is a very small yardage proportionately; does not think the tamping material would average one-third of the whole; handled in that way, costs more, but would not exceed the 10-cent estimate. Figured on tamping to the spring line and under the pipe; is not figuring on sacrificing any profit; figures on backfilling by machine. It would cost more to fill it by hand; if one-third was filled by hand, it would cost more than
882 filling by machine. Metcalfe and Anderson's figure on the distribution system is $4,332,677, and witness' figure is $3,618,051, or a difference of $714,626. Witness has omitted cost of laying pipes parallel to street cars and the cost of the taps for service connection, which accounts for a difference of $249,960, leaving a net difference of $464,666.

A very large item is the cast iron pipe itself. Compared Exhibit 57, page 130, item 1, with Exhibit C, page 365; there is a difference in allowance on the cost of the pipe of $26,645. If additional switching charges had to be paid to the railroad, that would have to be added; there is an average haul of two miles, and witness figures 20 cents per ton-mile, making a transportation cost of 40 cents per ton; if this estimate is too low, that would have to be added. Figur-

ing on the basis of 30 cents per ton-mile, it would make a difference of $12,000. These two items would possibly absorb the difference between the two estimates.

As to specials or castings, witness' estimate, shown on Exhibit 57, page 170, item 2, is $95,557; Metcalfe and Anderson's estimate, Exhibit C, page 365, item 2, $106,540. It appears on page 110-B, of Exhibit C, Class S, item 2, special weights, should have been 3,044,000 pounds, which makes a correction of 11½ tons; witness overlooked that. The average price used by witness $50 per ton; is not aware that the average price that the water company has had to pay for such items from 1904 to 1913 is $70 per ton, and never less than $60 per ton. Witness took the quotation of the C. F. & I.; was not aware that the water company had purchased a great many from the C. F. & I. Such items vary in price, and witness took the present-day quotations. Thinks price on the specials is reasonably low; not necessary to take an average price; would be willing to take the C. F. & I. prices; presumes they would agree to deliver that quantity of pipe in the future as needed.

Unit price on cast iron pipe, F. O. B. Denver, is considerably higher than it has been in the past, and witness thinks one offsets the other; is not aware that the unit price for cast iron pipe used by him is close to the average paid by the water company. With regard to the specials, has made no attempt to arrive at average unit price; simply took last quotation.

Estimates that sixty per cent of the distribution work could be done by trenching machines, forty per cent by hand.

The unit price for excavation only with machines is 21.4 cents per cubic yard, and 10 cents per cubic yard for backfill; arrives at this by calculating the estimated cost of operation of the machine per day, including depreciation and interest on capital, assumes an average lineal footage per day, translates that into cubic
883 yards, and divides the day's cost by the daily cubic yardage; would have two men on the machine—an engineer and fireman; does not have a gang with the machine; has a watchman at night. That is all the crew witness ever used on a machine in the city.

Has operated machines a great many months and years at a time in Denver, and has never had a large crew; the machine moves itself from one place to another.

On sixty per cent of the work there would be no obstruction, and it is so assumed. Would dig the trenches two feet; five per cent allowed for bell holes. Different widths of trench are tabulated on Exhibit 58, page 116. Has estimated a thousand linear feet per day on the distribution system.

In building the Montclair sewer, averaged 980 feet a day, 9 feet six inches deep, 80,000 or 90,000 feet long. There was some of it 24 feet deep that was dug by hand; dug 90 per cent of it with machines. There were 17 or 18 miles of trench; 15 miles was dug with machine; that was five or six years ago. Understands that the distribution system would require several hundred miles of ditch; that would not alter the conditions.

That sewer district was mostly south of Colfax and west of Phipps Sanatorium; does not remember the exact western boundary; thinks it was Monaco Street. The country there is sparsely settled. The work was in the streets; had some obstructions. The sewer was nearly twice as deep as the water line would be. Have operated in North Denver, East Denver, South Denver, but none in West Denver. A thousand feet per day on such a sewer would be equivalent in capacity to 2,000 feet per day on a water line. Has used a trenching machine in South Denver, where it is all settled up, for water and gas pipes and sewer work; work was in the streets, sometimes in the middle and sometimes to one side of the street; used a Potter machine in South Denver; that is not a trenching machine; thinks he averaged five, six or seven hundred feet per day, and hauled away the surplus dirt; but did not have a breakdown that could not be fixed in a few minutes; had to stop the machine once in a while, and the fixed charges went on; have done work from Boulevard F out as far south as 20th Street and as far north as 24th, and as far west as Manhattan Beach; that was sewer work; a great deal of that district pretty well settled; it was a sanitary sewer. Never did less than 500 feet with a trenching machine—from that up to seven and eight hundred; allowed for the hand work mostly in the main part of the city; could use the trenching machines on the east side of Boulevard F.

Put a sewer down 16th Street about ten or twelve years ago by hand work, after the street was paved; went twice or three
884 times as deep as with a water works system; backfilling did not cost much; it is the excavation that costs; does not recollect what the costs were; maybe somewhere between 75 cents and a dollar; it was a difficult job; had water mains to battle with; would not have the same difficulties with a water system; ought not to have trouble with the telephone conduits; would meet with the steam heating conduits.

Made estimate on the theory that the obstructions mentioned would not interfere much; put in storm sewer from 14th Street down to Cherry Creek and from City Hall up to Colfax, without any trouble; that is on the edge of the down town district; encountered a great many gas service pipes.

The steam heating company recently relaid nine miles of conduits, and work was done by hand; does not know what their cost was. The total cost of trenching and backfilling distribution system, as shown in Exhibit 57, pages 134 and 135, was $724,101, and that compares with the Metcalfe and Anderson figures in Exhibit C, aggregating $995,817; realizes that that difference is $271,716, and is an important part of the difference between the two sets of estimates on distribution system. Witness is satisfied that his estimate will cover the trenching, with a reasonable profit.

Exhibit 57, pages 135 and 136, contains estimate of $378,507 for removing and replacing asphalt paving alone. There is an error in asphalt paving; it reads "6½ inches", and should be "8½" on page 106 of Exhibit 58.

Witness' estimate of $378,507 varies somewhat from the Metcalfe

and Anderson estimate of $539,558, and the Public Utilities Engineers' estimate of $504,310.

The width of the cut is the same width as the trench. Has had experience in cutting and replacing pavement. Thinks it is necessary to make the cut a trifle wider than the trench—has not the details with him—and made allowance for that. Thinks provision was made for margin of six inches on each side of the trench; this applies to all the paving. Has not found any estimate in connection with the infiltration galleries of Platte Canon covering the trenching for 4,111 feet of perforated wood-stave pipe; there is no question but what it is omitted. On the Cheesman dam construction, took the quantities used by Metcalfe and Anderson; did not know that they had deducted from the total contents of the dam the amount that was there by reason of the prior construction.

Witness' estimate of preliminary expenses included no part of the construction of the dam; had no way of finding out the fact that the quantities estimated by Metcalfe and Anderson for the dam were exclusive of other quantities left in the dam from previous work; were not able to get any information on the point from the
885 water company; took the matter up with Mr. Skouland. Witness had before him the data in Exhibit C, page 121, item 6-*a*.

There were items aggregating $27,193, for iron, steel, concrete and labor, concerning which witness could get no information. Witness took only the quantities in Exhibit C for the Cheesman dam construction. By taking Exhibit C, witness cannot see where there is any omitted yardage; witness has an item of $57,260, which covers preliminary expenses; witness has an item of $30,000 to cover flood contingencies. If there were quantities in the dam in excess of those shown in Exhibit C, they would belong there, but witness was not able to find out from the officers of the company what the fact was regarding it.

Witness disallows entirely item of $1,200 for ice-cutting in connection with the Platte river intake works. There is always a water hazard in connection with the construction of a dam in a flowing stream; there is danger of floods in the summer. Would try to start such construction at the most favorable period of the year; more apt to do that on a large job than on a small one; has made allowance for dikes, diversion dams, etc.

There is an allowance of $1,361 for diversion dam; thinks that dam would handle the water; has made no other allowance for flood hazard; understands the Intake dam work was done in the winter time; did not know that in the construction of the dam there was actually a flood in September, that washed it all out. Has been fighting water in Cherry Creek for two years; never has seen an estimate for water hazard; has allowed flood damage to be liberal; actually allowed more for the flood than for the actual cost of the diversion dam; at the lower location, an item of $1,600 is stricken out, and no similar allowance has been made. Has had some experience in sidewalk concrete work and work in buildings; the fair cost of laying Portland cement—concrete cement—six inches in thickness, would be $1.35 per square yard, as prices exist today; they are pretty low.

Gravel is pretty cheap; it is getting scarcer now. Three or four years ago cement was higher; figured the concrete in the bottom of the Capitol Hill reservoir on a cubic yardage basis; raised the water company's estimate 50 cents per cubic yard.

Witness' estimate on the concrete in the bottom of Capitol Hill reservoir would be $1.42; the item of $1.42 per square yard is an average for the bottom and sides. Refigures and says it would be worth $1.30 in the bottom and $1.50 on the sides; there are larger quantities than in a sidewalk, and it covers more territory.

886 Estimates $1.25 per cubic yard for handling material, $1.30 per cubic yard for hauling gravel or sand, and 20 cents per ton-mile for cement; that makes cement cost per barrel $1.87; original cost $1.62.

Will leave his estimate at $1.50 per square yard for bottom and sides; got $4 per square yard for laying the sidewalk around the Federal Building, but the top two inches is granite screenings, very fine. Cement cost was $4.25 per barrel.

Has prepared a tabulation showing his bid upon the assumption that the water company has prepared plans and specifications to reproduce the work and submitted the matter for competitive bidding, which is read into the record; the total, including deduction for reduced labor cost, is $8,341,995; this assumed bid starts with a basic figure of $8,178,046; adds to that items which he would include as a contractor, being the same as those on page 143 of Exhibit 57. To make this bid comparable with Metcalfe and Anderson's, necessary to add Ashland Avenue reservoir lining, $49,424; service connections, $249,960, making an aggregate of $8,773,623, as against the Metcalfe and Anderson estimate of $9,413,049, or an estimate of 93.3 per cent of the Metcalfe and Anderson estimate, the difference being $639,426. To this should be added the omitted excavation of the trench at the Platte Canon filter beds.

This bid would include only contractor's overhead; incidentals and contingencies represented by the sum of $408,902, appearing on page 143 of Exhibit 57, must be taken care of by the company on the theory of the submitted bid.

Any incidentals and contingenices that contractor might need must be covered by his five per cent profit. If the work could not be carried out in accordance with the plans and specifications, they would have to be changed and the company stand the cost; if quantities were increased or decreased, price to contractor would vary accordingly.

Assumes that there will be a certain amount of rock excavation, dry excavation, wet excavation, etc. If the contractor has not properly estimated different classes of work, it is his gamble. Would be willing to take this assumed job at the price given, and stake all he has got on it.

Has not made any provision for contractor's contingencies; the contract is safe at the figure given. Has figured on timbering forty per cent of the distribution system; does not think it will require forty per cent.

The twelve and one-half per cent contractor's profit covers the minor incidentals, and not contingencies of the work itself. If con-

tingencies are to be taken care of at all, it is in the basic figures.

887 Allowance of five per cent at the bottom of page 143 of Exhibit 57 is left the same as incidentals and contingencies—that is, supervision is covered by the two per cent.

Still thinks there would be no engineering expense for the contractor; could carry out the contract without engineering assistance; that is a different thing from having engineering assistance to make up figures; Mr. Kelsey, an engineer, of Portland, has worked with the witness during all the time he has been engaged in making the estimate; all technical figures were made by him; thinks the bid could be made without any technical assistance; if any is needed, the two per cent out of the twelve and one-half per cent contractor's profit will take care of it. This two per cent covers contingent expenses, headquarters expense, superintendence, transportation, every incidental expense, auditing department, bookkeeping, paymaster, purchasing department, telephone expense, for the full period of four years. Would have three or four jobs going at the same time.

The five per cent estimate for incidentals on page 143 of Exhibit 57 was for the company's incidentals and contingencies. Thinks now that five per cent for incidentals and contingencies should be figured on the base of $8,474,238, increasing the allowance by $423,717. Item of one per cent for inspection should be computed on the same base; engineering and supervision computed at five per cent, should now be computed on the base of $8,598,846; the $408,902 item for incidentals and contingencies must be added to $8,474,238, and to the sum so obtained must apply percentage of one per cent for testing materials, five per cent for engineering and supervision, etc.

On an extensive job like the one in question, contractor would require a large plant, whose total cost would be approximately $150,000 to $175,000. The estimate of $50,000 for the contractor's plant at Cheesman is plenty; figured on doing the drilling at Cheesman by hand. Estimate covers drills, but not compressing machinery; does not include automatic drills; takes care of the interest during construction on the contractor's plant.

Witness JOHN GAFFEY resumed the stands for further

Cross-examination by Mr. Dorsey:

Company's overhead and interest during construction would be arrived at by deducting from the total overhead and interest during construction on page 143 of Exhibit 57 the items of contractor's overhead and interest during construction set forth in the proposed bid on page 3,698 of the testimony; the item of $200,000 appear-

888 ing on page 143 of Exhibit 57, as administration and legal expense is arrived at by approximation, and is not the application of a percentage to a base; witness made the approximation. Have had no experience in financing, managing and operating a public utility company; does not know what costs such a company has to meet; the company's interest during construction would be $510,719. The note on page 112 of Exhibit 58 shows the details of figuring interest during construction and the basis was 6 per cent

for one and one-half years on dam, administration and legal expenses, and 6 per cent for one year on balance; interest during construction on Cheesman dam amounts to $112,021, which is arrived at by adding $200,000 legal expense and administration to the total cost of the dam, and taking 6 per cent of the total.

There would be a year's preliminary work on Lake Cheesman and three years for construction, making in all four years. There would be a considerable investment in engineering before construction was begun. At the end of the first year of construction, would receive payment from the company for one-third of the contract price, and one-third each year thereafter; the rest of the plant would be begun a year later, and actual construction would be preceded by preliminary investigations, engineering work, etc., and would require an investment before the beginning of the two years' period of construction.

This preliminary work would take several months, during which all rights of way for the conduits would have to be acquired; must first determine where the pipes are to be laid, and get the rights of way; a year would be all the time necessary for this. Would have all the plant come to final completion at the same time. During the first year of construction of the rest of the plant would receive one-half of the contract price, and would receive the balance at the end of the second year. Thinks two years is ample time for the construction of Lake Cheesman; has not constructed a reservoir as large as Lake Cheesman, but constructed the Granite Springs dam for the government at Fort Russell; that is the same character of construction; it is plug and feather work; it is same kind of masonry except the face of the dam; it was 97 feet high, 72 feet on the base and 408 feet on the crest; it cost $200,000; did not lay any masonry the first year; put in the masonry the second year; seven or eight months of actual work; the bids were opened and the contracts awarded on September 16, 1902, and the dam completed on the 4th of July, 1904; had no other experience in constructing dams comparable to Lake Cheesman. Went into the time for constructing Lake Cheesman and the rest of the plant very thoroughly, and is satisfied he can do it in that time. It is only a question of
889 organization; thinks has taken care of all costs due to the speed.

Has paid no attention to what other people have done; makes own calculations; never has produced such a work in the time, but is satisfied he can do it; can put enough sub-contractors on it to clean it up in one year; thinks he could get a delivery of the cast iron pipe required in two years at the prices mentioned. People want to sell pipe; do not want to hold it; that is why they manufacture it. There are a large number of plants in the United States that are not doing much today; does not rely on temporary conditions in such plants; has spent practically all of his active life in contracting business; has spent 24 years in Denver and approximately 12 years on railroad construction work and bridge building; before coming to Denver was manager and estimator on railroad construction and bridges work; built the Homestake line from Piedmont to Lead

City in 1888; that was one of the first contracts witness took for himself. Has been engaged in business on his own account ever since coming to Denver; a great deal of the work done since coming to Denver has been right in the city; does a great deal of grading and curbing; has handled several billion yards of such work; has never had any experience in the carrying out of contracts for laying cast-iron pipe, in large conduits; sewer contracts include the construction of the sewer conduits; mostly vitrified pipe and some concrete; the largest contract witness has had involved about four hundred and some add thousand dollars; have had several contracts that aggregate over $500,000 to a million dollars on the books at once; the large contract spoken of was the Capitol Hill storm sewer; has worked under every engineer that has been at the Board of Public Works since the witness has been in Denver; work done under Commissioner Hunter has been within the last ten years; don't agree with Mr. Hunter on the labor proposition; has figured $2.50 for eight-hour day, which is above current labor; $5 a day for teams, which is above contract price; such labor prices have never prevailed; the fact that the city pays such prices does not fix the market. Witness made his supplementary estimate on the basis of $2.25 for 10 hours work, common labor, instead of $2.50 for eight hours work. Knows he can get common labor at that low a price, and can get a team and driver for $5 a day, 10 hours work; could have done that during the last three years of five years; $2 would have been the standard wages for that class of labor for ten hours; outside the city, do not pretend to work less than ten hours; the men are not unionized; teamsters are not unionized outside of the city. Great deal of the work that witness has done before the 8-hour and $2.25
890 schedule was introduced was paid for as low at $1.80 for ten hours; that was three or four years ago. None of the utilities companies in the city are paying $2.25 for 10 hours' work; they may be paying $5 for teams; used to pay $1.75; twelve years ago paid $1.60; paid $1.60 on the Capitol Hill storm sewer, and the estimate of $2.25 is a substantial increase.

Would venture to enter into a ten million dollar contract on the assumption of $2.25 a day for 10 hours, and $5 for a team, 10-hour day, contractor's profit estimated at 10 per cent, and two per cent added to cover incidentals and contingencies; that ten per cent is computed on the basic cost, without including in the base an item on account of contractor's overhead. Those figures are for the distribution system, and are not low for such a job. The estimate on Cheesman dam is fifteen per cent, and out of that fifteen per cent two per cent is for incidentals and contingencies. The incidentals are included in overhead expenses; the two per cent is for contingencies, leaving 13 per cent for profit; increases the profit on Cheesman because of being away from the base of supplies, and are entitled to a little more profit; has estimated large jobs on less than 10 per cent profit, and did not then get the job. For several years in Denver have not estimated on more than 10 per cent profit. Five years ago did not dare go over fifteen per cent; twelve years ago contractor's prices were about what they are now.

Speaking of the period of time between ten years ago and five years ago, might have expected to get fifteen per cent in some instances, but, as a general rule, would not; lately has not pretended to figure over 10 per cent; does not think that the work that has been let in Denver has netted contractors five per cent; would not feel like taking a job without ten per cent profit.

General contracting work in the vicinity is done for less profit; the average grading contractor in the last five or six years has gone broke digging dirt at from 9 to 13 cents a yard; has let a good deal of it to sub-contractors on street grading that had to be levelled off and finished for fourteen cents; would not want any such work at 14 cents. Unit prices for such work are lower now than they have been for some time; for the last ten years the tendency here has been low.

Competition between contractors has had something to do with it; there are several contracting firms in Denver having a large investment in plants; the ten per cent profit is not ordinarily figured on the cost of all the material; for instance, on sewer pipe and brick profit would not be figured; on the Capitol Hill storm sewer, figured four or five per cent on material, including cement, pipe and
891 brick; figured ten per cent profit as applied to the rest of the job; wanted it and figured low; that job was let in 1890; it took two or three years to finish it.

Redirect examination by Mr. Stevens:

Referring to the estimate read into the record on page 3698, witness would be willing to make a contract to build a plant similar to the present plant of The Denver Union Water Company for the total price of $8,341,995 plus a possible addition of $18,480 for omitted excavation.

As to the incidentals and engineering which the employing company would have to pay, the figures are just approximate. On all matters that concern the contractor, figures show what witness would take the job for. Left out the Ashland Avenue reservoir lining, because there was none there—that is, there is one there, but it was deteriorated and rotted and of no benefit to the reservoir; left out taps, because Mr. Hunter said they were paid for by the people and not the water company; left out the estimate of the excess cost of laying pipes parallel with the street railways, for the same reason; they could be put where there were no street railways; many were laid before the tracks were put there; would not now lay them under the tracks. Witness increased the water company's estimate on the Buffalo road from $15,000 to $25,610, in order to put it in first-class shape for motor trucks; road is not in good condition at the present time, but could be put in first-class condition for those figures.

Witness was interrogated about specific items in his Exhibits 57 and 58 wherein his estimate was higher than that of Metcalfe and Anderson, and the details of the differences with reference to the pages in Exhibits 57 and 58 were testified to by him, and he stated that all his estimates were arrived at by the same basic figures. Witness has gone over every item in Exhibit C and compared those with items valued by him, and examined them fully; has placed his

own estimates without regard to whether they were higher or lower than the estimates in Exhibit C; in doing this work went over the whole system; saw the exposed pipe lines on the road to Platte canon; it was a 24- or 36-inch wood-stave pipe line, in rather poor condition; understood it had been in 24 years; possibly good for the age of the pipe, but was in poor condition. Witness keeps cost of other construction in detail, and in bidding on subsequent work uses it in a general way. Keeps gangs for different kinds of work that he is doing, when there is work for them to do. The two per cent included in the contractor's profit is to cover administration, office expenses, and such as that. Figured it out to one and one-eighth per
892 cent; that item would amount to about $160,000 in this estimate; made allowance for all possible risk in performing the contract. Bids a unit price for each class of excavation, and would be paid that price for the total amount of any class of excavation encountered.

Submitted original figures more as an estimate by which the city might do the work, through witness as a contractor, than through a private employer, and as to all matters outside of those particularly concerning witness as a contractor, they were estimates made for the employer and intended to be ample to cover all contingencies of the employer.

On page 134 of Exhibit 57 it appears that there would be 527,907 cubic yards of machine excavation, and 508,896 cubic yards of hand excavation; it appears from Exhibit 58, page 104, that witness allowed $40,000 more for timbering trenches than was allowed by Metcalfe and Anderson. Witness was asked whether he would actually do the work at less than the estimated figure, to which objection was made and overruled; would be willing to take the contract at the figure fixed, or less, if he had to; made no provision for cutting ice; put in a diversion dam to take care of the water; that appears on page 12 of Exhibit 57; the amount is $1,361—just a temporary dam.

Omitted the estimate for excess cost of laying pipes under car tracks or parallel with car tracks, because Mr. Hunter stated it was not necessary to lay any of the pipe under any car line; that the car line was built after the pipes were laid. Would just as soon have bonds as cash.

Recross-examination by Mr. Dorsey:

The pipes that are in the streets now actually exist under car tracks. Pipes could be laid elsewhere in the street, but if actually reproducing the identical plant, they would be under the tracks. Messrs. Metcalfe and Anderson figured on building the same diverting dam. Witness simply omitted the item of ice cutting.

Has not made any actual investigation of the cost to the water company of its works. Referring to the items on the last page of Exhibit 57, which are additional to witness' bid as a contractor, says they are intended to cover the additional cost *of* the owner of the property, whether a city or private individual; does not know whether those costs would be the same in the case of the city as in the case of a private corporation; thinks they would be fully as cheap; thinks

a corporation could get the money at 6 per cent; that is what the city pays for it. Keeps a permanent gang at work when he has
893 work for them; has a permanent office force, a permanent shop or warehouse, requiring permanent expense. The amount allowed for overhead includes the expense going on while the contract is being carried out, and also the overhead during intervening periods. The piece of bad wood-stave pipe seen by witness was being repaired; about six feet exposed; conduit is a good many miles long; witness saw 50 feet of it, and knows nothing about the condition of the rest of it; it was opened near Chatfield, close by the road. In making estimates, had Exhibit C before him; did not have the reports of the Public Utilities Commission; took Metcalfe and Anderson's figures for quantities of different materials; used a basic figure for common labor of $2.50 for eight hour day, figuring that if the city was doing the work it would have to pay that under the ordinance; for same reason, used $5 a day for team for eight hours.

After making figures, talked it over with Mr. Hunter, and witness stuck to $2.50, 8-hours, for men; when it was too late to go back again and change figures. Hunter insisted that the figures be made for current wages; witness could not go into it thoroughly, but made an approximate estimate. Hunter thought that witness should use the current wages. If the work was being done by the city, the ordinary scale of wages would have to be employed. Is not positive that any excavation was omitted at the Platte Canon filter beds; if it was omitted, the figure would be $18,400.

Witness cannot tell whether the 67,000 yards used is all in the crib, or whether it takes the crib and the other excavation to make it up. If it should be added, all the necessary overhead charges should be applied to it.

Considers that the Ashland Avenue reservoir asphalt lining is a detriment and can give no credit for it; estimated building a very much better road from Buffalo to Cheesman than is now there, which made the cost somewhat larger. That extra road cost reduced the haulage cost; on cement this reduction would be 2 cents per barrel; from any point of view, witness' estimate is considerably less than that of Metcalfe and Anderson; there are several thousand items in Exhibit 57; on 90 of the items witness is higher than Metcalfe and Anderson, and on the rest he is lower; the large difference is in the excavation on supply lines and in the distribution system. By the words "same basic figures apply" used by witness in answer to Mr. Stevens' questions, pages 3744 to 3753, witness meant that in specials, cast iron pipe or wood pipe, in arriving at basic figures, he took first the cost of the wood-stave, the cost of the band, loading, unloading and hauling, labor, construction and additional profit added to it; they were all figured on the same basis, and the result was
894 a basic figure, which was applied to all the items referred to in Mr. Stevens questions; used the same unit prices, and applied the same figures for overhead.

Started the latter part of July to do the preliminary work; the estimates were completed about November 5th. Reference notes were not completed then; they were compiled afterwards; was assisted by Mr.

Frank Kelsey of Portland, Oregon, whose duties were generally the compiling of data; Mr. Hiram Phillips did not cooperate. Investigation was independent of any suggestions from Mr. Phillips; every figure in the estimate is witness', with the exception of the supplemental estimate, which was arrived at on a basis different from what witness wanted to adopt; permitted no one to make use of records, maps, plans or other data which he used for getting at the estimates; got a great deal of information from the water company by way of original maps and plans; did not have all he wanted, but had a great many.

JOHN GAFFY, a witness for the defendants, recalled for further

Redirect examination by Mr. Stevens:

Witness omitted excavation on the perforated pipe line, and has added $18,480.

Covers excavation and backfilling; has added the substructure which had been omitted from one of the buildings, amounting to $1,862. As to the sub-structure referred to in Exhibit 57, page 52, there was no omission; the sub-structure was estimated, but it was typewritten "Super-structure."

After adding these corrections, the contractor's estimate is $8,361,406, after deducting $132,243 on account of the difference in labor costs; made the corrections in the proper subdivisions, and was enabled to make proper allowance of percentage on buildings and contractor's bond; the proper allowance as shown by memorandum marked Exhibit 66 would be $8,066,146 before making any allowance for profit on buildings, contractor's bond, liability and public insurance and interest charges. Memorandum, Exhibit 65, contains resume of estimate.

The measurements of the architects covered all the houses that are in Exhibit C; there is one measuring house listed in Exhibit C which cannot be found.

895 Recross-examination by Mr. Dorsey:

Can say nothing about the Littleton flour mill except what is already in the testimony; has not had time to go into it, and knows nothing more of it than he did when on the stand originally.

THOMAS F. WALSH, a witness for the defendants.

Direct examination by Mr. Stevens:

Architect, engaged in business 24 years; practiced in Denver 20 years; made an estimate on buildings of The Denver Union Water Company at the instance of Mr. John Gaffy. Measured all the buildings for which drawings could be obtained from the water company; laid them out and figured them; made drawings outside of those furnished by the company; covered the buildings; the houses at the different sub-stations, from Cheesman dam on down through Platte Canon and in the city here. Was first taken over the ground by Mr. Gaffy and shown all the buildings that were to be measured

and estimated. Has the drawings of all the buildings owned by the water company at Cheesman, Canon Spur, Willard filters, Marston lake and Littleton; those witness measured. In the city the company furnished drawings of the different buildings, pumping stations and so forth. Those drawings were taken and checked at the buildings. Took the company's drawings and checked and verified them. Furnished the estimates to Gaffy & Keefe Construction Company. Witness produced Exhibit 57, which was a list furnished by Mr. Gaffy, copied by Mr. Gaffy in his estimate.

Exhibit 61 offered, identified by witness, as a detailed statement and summary of the estimates of The Denver Union Water Company, and contains all the figures used in making up that estimate.

Some drawings were obained from the water company and the balance were made by the witness. Received all the Capitol Hill station, West Denver station, Ashland Avenue station drawings from the company; all the rest were measured. The details set forth in Exhibit 61 were full enough to comprehend exactly what witness based his estimates on. Exhibit 62 identified and offered in evidence. It is a book of photographs of the buildings belonging to The Denver Union Water Company.

From summary on page 31 of Exhibit 61 witness shows all detailed estimates and the total estimate. The column marked
896 "Inventory" is taken from Exhibit C of the water company estimate, and witness' estimate is in column marked "Estimate." Understood that the figures furnished by Gaffy & Keefe were from Exhibit C. The total estimate on buildings was $252,257. Detailed and fully set forth in Exhibit 61.

Cross-examination by Mr. Dorsey:

Witness got the figures designated "Total as per Inventory of Exhibit C", on page 37 of Exhibit 61, from Gaffy and Keefe. Did not personally examine Exhibit C. The figures designated "Total as per Walsh and Willison's Estimate" are those made by Messrs. Walsh and Willison. Would not include additions made by Mr. Gaffy of five per cent for contractor's profit, or interest during construction on payments to be made to sub-contractors. Does not include company's overhead, interest during construction or like overhead. Walsh and Willison's estimates cover estimates of profit to the building contractor. Referring to page 3 of Exhibit 61, and detailed figures thereon, the contractor's profit is included in each item. The figures are for work in place, including contractor's profit, labor and so forth. Taking item of 820 linear feet of 10-inch logs, at 10 cents per linear foot, $82; that is the price in the building; the contractor's profit varies usually ten to fifteen per cent. Figured the lumber at so much per thousand, in the building, including the contractor's profit, nails, etc. On the next item, flooring: The dealer would be paid $34 a thousand; it would cost $8 to $10 to lay it, and the difference between $34 and $50 per thousand covers transportation charge. It would cost $6 per thousand to transport it to Cheesman from Denver. Does not think it amounts to that, including

the wagon haul from the railroad. $8 or $10 would include the contractor's profit and laying.

Cannot tell whether contractor would get any profit on the lumber. In Denver they figure on so much per thousand for lumber in place, including contractor's profit, nails. Thinks the contractor would undertake the job at Lake Cheesman on the same basis as at Denver. Did not estimate the number of carloads of material that would be required in the cottages. Thinks 7,500 feet of rough lumber can be cut within a mile of the cottage, and that would cut down the freight rate. There is no mill there now. Would have to build another mill or bring it from Denver.

Mexican rough lumber in Denver is $20 to $22 per thousand. Estimates on the logs covers foundation. There is an item of $105 for walks, retaining walls, fence, steps, and so forth, on page 5, that includes digging for the foundations for all the structures at
897 Cheesman. Whatever excavation is done is done by a little scraper and most of it is on a sidehill; would not have to be excavated by dynamite. Mostly shale or float; not very much excavation. Hillside houses have foundation in front or toward lake of ten or twelve feet, and at the rear they rest directly in the hillside. The detail on page 10 of Exhibit 61 covers the buildings at the filters except that the gate-valve vault and house is on page 9; although page 9 relates to subdivision *e*, but that is the way it was received from Gaffy and Keefe; there is one at Marston; does not belong there, but was in the inventory. On page 10 of Exhibit 61, the third item in reference to office or administration buildings, common brick, 36,000 at $11, includes laying. Brick cost $7.50 to $8 per thousand. Brick has to be purchased in Denver, transported on the railroad and hauled in wagons for a short haul. $11 will put the brick in the wall at Waterton, and include a profit to the contractor. Did not make a specific allowance for laying brick. Contractor will put it in the wall at so much. Figured the wall measurement at so much per cubic foot, including all the openings, and the contractor will gain in laying the brick. Figures 22½ brick to the foot, and there is a gain of five and a half brick to the foot; that goes as his profit. There is less in the building by 17 per cent than the wall measurement. The 40-inch measuring chamber at Waterton is page 13 at the top. At page 14, valve-house at reservoir, is the reservoir gate house at Platte canon.

Flour mill at Littleton is on page 22. Estimate of $5,500 covers all the mechanical equipment for an 80-barrel mill. Got the figures from Mr. Johnson of the Hungarian Mill. Witness knew nothing of such things. Made no list of the machinery. Mr. Johnson was familiar with the machinery and made the estimate of $5,500; seemed familiar with what was in the mill.

Knows that Exhibit C contained a detailed schedule of the machinery in the mill. Witness did not see it. Was not aware that the Stearns-Roger Company of Denver and Pueblo had made an actual inspection of the machinery and placed their estimate at $25,715. Stearns-Roger Mfg. Company is a machinery house. The difference between the estimate on the Littleton mill in Exhibit

C and witness' estimate, accounts for a large part of the difference in the total between Metcalfe and Anderson's estimate and witness' estimate. Cannot say that allowance of $5,500 for the Littleton Mill is accurate. Witness' figures include contractors' or sub-contractors' profit. The general contract has a five per cent overhead charge on it. If the estimates in Exhibit C cover all of the overhead, they would not be comparable with witness' estimate. Does not know whether Johnson ever in-
898 ventoried and listed the machinery at the Littleton mill. Supposed his estimate contemplated the mill installed. Mr. Willison asked Mr. Johnson over the telephone, and the question was answered immediately. Referring to page 14 of Exhibit 61, witness does not remember whether he could measure the sub-structure. Did not examine Exhibit C to get the quantity of excavation and concrete actually used in that sub-structure. Does not believe that valve house at Waterton was actually measured. Does not know that the sub-structure goes down 30 feet. If water company had furnished the drawings in the first place, would have estimated it right. Would not state that the drawings in question were not among the drawings furnished when witness went out.

Was asked by Mr. Gaffy to omit the sub-structure on most of the valve houses. Gaffy did not ask witness to omit that particular one, but does not recollect measuring it. Had access to Exhibit C, but took his own figures. Referring to page 13 of Exhibit 61, did not actually measure the item of excavation, 181½ cubic yards. Did not have the plans. Asked the foreman at Waterton whether he had the plans. Asked for the plans through Gaffy and Keefe. Couple of months later Mr. Gaffy saw Mr. Hughes and Mr. Hughes obtained quite a number of drawings. Did not observe the statement in Exhibit C as to the quantity of excavation. Does not know where 315 cubic yards shown on Exhibit C comes in. Price of 50 cents per cubic yard for excavation includes backfill. Measured the concrete in the building and assumed the bottom; made it two feet. Measured all the concrete we could see, and were told by one of the men that the walls were two feet thick, and so figured it. He had the depth of 17 and 19 feet; determined by the sounding. Sounded from the finished floor to the floor of the chamber, and then assumed that the depth below was two feet. On page 14 of Exhibit 61, double valve house at Watertown, figured superstructure only. Assumed that Mr. Gaffy was going to figure on the rest of the things. Does not know whether Mr. Gaffy put in the sub-structures, on Exhibit C, page 176, item *h*-6, sub-items *a*, *b*, *c*, *d*, *f*, and *g*, but he requested witness to omit them.

The inclusion of these items would add considerably to the structure. On page 12 of Exhibit 61 the item one brick bunkhouse, includes the whole building, the footings under the building; assumed three feet for excavation and concrete. Figured the buildings by the cubic foot.

Took the outer dimensions and average height. Building was not as good as some of the rest, so the cubic foot price was reduced. Was not finished like the rest. Took the office building and the

superintendent's buildings and residence and itemized them. Figured the cost of cubic measurement of the house, and estab-
899 lished a cubic foot price for a similar house. That is a fair average method. There are no ways of measuring the foundation; it was filled up inside; there was no basement; we used the unit price; standard price per cubic foot was 11 1/3 cents, reduced to 10 cents on the bunkhouse; measured from grade level to roof to get cubical contents. With this method did not use different standard for houses with basements. Only apply the standard to houses that are similar. Page 31 refers to group of buildings at Platte Canon. Sub-item, excavating, 181½ cubic yards, was reached by actual measurement. Walls were solid concrete; assumed a thickness of two feet. In Exhibit C it is 345 cubic yards. Witness did not have the map. Was not aware that in the stone and brick power house the fourth sub-item is estimated by witness at 480 cubic yards, while Exhibit C states it to be 530 cubic yards; got the figures by measuring the building; had no plans and specifications; could not be measured exactly at the completion of the structure.

Next item, 203 cubic yards of concrete. Exhibit C states the concrete foundation requires 210 cubic yards, and floor and foundation, 15.2 cubic yards. Witness thinks he hit that pretty close, his estimate being 203 cubic yards as against 225.2; assumed a thickness of the wall which witness, as an architect, would construct.

Redirect examination by Mr. Stevens:

When a difference in quantity appears between witness' estimates and those in Exhibit C, witness took his own measurements. On page 15 of Exhibit 61, it appears that there is added to the Walsh and Willison estimate of $36,368, the sum of $5,632, for necessary sub-structures, stacks, foundations, bridges, and so forth. Witness assumes that that addition refers to property omitted by witness. In Exhibit 61, at the end of every distinct estimate, there is an addition by Mr. Gaffy for things not estimated by the witness. Witness does not think he measured the depth of the foundation of the valve house at reservoir, Watertown. The estimate for reproducing the buildings is with absolutely new material. Made no allowances for depreciation on account of age or wear.

Recross-examination by Mr. Dorsey:

More accurate estimates could be made by taking the plans and specifications; one gets a better detailed estimate; and that is true of sub-structures and underground things, which cannot be seen. Witness is not sure what items Mr. Gaffy added. Does not believe that Mr. Gaffy's estimates covered the sub-foundations that were omitted by witness.

900 Did not mean to say on redirect-examination that Mr. Gaffy had included foundations, to which witness' attention was called on cross-examination. Is not aware of the fact that the grade of work in foundations of gatehouses and sub-structures in water works structures is different from the ordinary house-wall

work by reason of the necessity for making it water-tight, on account of bacterial considerations. Whether that would make greater expense or not, depends on what kind of a house is meant. Made no additional allowance for such consideration. Has had no experience with water works structures.

Redirect examination by Mr. Stevens:

Referring to page 15 at the bottom of the page, the word "sub-structures" does not include the sub-structures for the valve house; includes stacks, foundations, which witness did not value. There are a number of items on the list furnished the witness by Mr. Gaffy which were not included in the estimate. Witness was instructed to omit the stack foundations where an iron stack was used —stone or brick foundation; that to be included in his chimney estimate. Fences and bridges were so omitted. Gave a price on the fences per foot, but did not figure the length of them.

T. F. Walsh, a witness for the defendants, recalled.

Direct examination by Mr. Stevens:

Witness made more investigation concerning foundations at Waterton; cannot find one measuring house listed on Exhibit C; did not find item 5 on page 176 of Exhibit C.

Was there yesterday afternoon to see if he could find it; measured the sub-structure of the valve house at Platte Canon reservoir; found a depth from the floor to the floor of the sub-structure of 34 feet, and on account of that we had to add to estimate; the addition is $1,862. On page 176, Exhibit C, item 8, H-5, is measuring chamber which cannot be found.

Cross-examination by Mr. Dorsey:

274 cubic yards on the valve house; measured the top of the wall at the floor line; measured the depth of the wall by sounding; got the measurement from the floor of the super-structure to the bottom of the sub-structure; assumed that the wall was 40 feet high, and allowed 34 feet as the average height of the wall; took the average thickness of the wall to a total height of 34 feet, and added that to the face of the floor; assumed the floor 6 feet thick. Did not see the company's plans on file in its engineering office; took an average thickness of 2 feet and 9 inches for the wall.

901 Robert Willison, a witness for the defendants.

Direct examination by Mr. Stevens:

Architect, 25 years in Denver; built the Auditorium, Municipal Bath House, assisted on the Ideal Building and Oxford Hotel, West Hotel, and many residences; is familiar with the prevailing prices for building material of all kinds in Denver and vicinity. Undertook to estimate cost of reproducing buildings of The Denver Union Water Company; started in August, 1914, and ended November 4th; worked with Mr. Walsh. Exhibit 61 correctly sets forth in detail

the results of the estimates of witness and Walsh. Was requested by Gaffy to get out the estimate; visited different subdivisions of the water company's property as described in Exhibit C; measured every building, outside heights, etc.; made complete specifications of materials, classified the buildings and computed a standard cost per foot of cubical contents for application to certain classes; in other cases, several buildings are valued on basis of itemized materials, cost of freight, workmanship. These prices include contractors' profit.

Proceeded just as would proceed for any employer who desires an estimate made on certain work in the building line. Considered that the cost set forth in Exhibit 61 was sufficient to cover all contingences; thinks estimates are liberal for both work and material and giving the contractor a good profit on the work.

Cross-examination by Mr. Dorsey:

Prices do not include architect's fee; did not include anything for general contractor's overhead or profit; interest during construction would be included in the contractor's profit; covered only sub-contractor's profit; architect's fees would be about five per cent, regardless of the size of the structure; in figuring lumber at Cheesman, presumed that the logs and rough lumber could be gotten in the vicinity of the lake; finished and dressed lumber would have to — shipped from Denver.

The freight from Denver would be 13 or 14 cents a hundred; this would be about $2 a thousand to Buffalo, and haulage would be $3 a thousand from Buffalo to Cheesman; in arriving at $2 a thousand for freight from Denver to Buffalo, eight cubic feet represents a thousand feet of lumber, board measure; weighs 26 pounds per cubic foot, giving 2,080 pounds; you would pay $4 a thousand feet of lumber, and the total cost of freight and haulage to Cheesman would be $7.

Refigures estimates, and concludes that the freight would be $2.70½.

902 Figures on hauling lumber from Buffalo to Cheesman by automobile trucks; cost would be $3 per thousand feet of lumber for the hauling.

Distance from Buffalo to Cheesman is 20 miles; contractor could not do the work without changing the road.

Did not go specifically into the question of how many tons could be carried at a load. Was building inspector in Denver between 1904 and 1912, and is now engaged in the general practice of the profession. Made the plans for the Auditorium; made the estimate of its cost; made no definite estimate of its cost based upon the plans, when the question of issuing bonds came up; had several engineers go over the different items; does not remember making an estimate that it would cost $300,000 to build the Auditorium; made a great many figures; plans and specifications were changed many times; did not make an estimate of $300,000 on the final plans and specifications; bonds were not issued on witness' estimates; bond issue was passed before the plans were thought of; does not remember estimat-

ing cost of Auditorium as it stands today to be $300,000. The actual cost of the building, outside of the ground, was $418,500. The final cost of the building was $635,000. Knows that the actual cost, including the ground, was not $765,000.

Redirect examination by Mr. Stevens:

The deficit in estimate on the Auditorium was by the contractor, and not by the architect.

DAVID G. GORDON, a witness for the defendants.

Direct examination by Mr. Stevens:

Has resided in Denver 20 years; is engineer and contractor; does water works and sewers only; has been so engaged since 1908; took mechanical engineering course at Cornell University; is associated with Percy J. Taylor, under the name of Gordon & Taylor Construction Company, with headquarters in Denver; during the past six years has had about eight contracts on sewer work in Denver—water works and water mains in different parts of the city; did sewer work in University Park, Park Hill, parts of the North Side, Washington Park district, Overland Park district and 24th and Walnut; laid water mains around Washington Park, near Overland Park, for the Public Utilities Commission, consisting of about 3,000 feet of 6-inch cast-iron pipe; has put in most of the water works that have been put in in the states of Colorado and Wyoming for the last two or three years—at Canon City, Montrose, Alamosa, Grand Valley, Olathe, Minturn, Fowler, Fort Logan, Johnstown,
903 Fort Lupton; Goodland, Kansas; Sidney, Nebraska, and Scotts Bluff, Nebraska; Casper, Wyoming, and Raton, New Mexico; is working on the last two at the present time.

Some of the enumerated work was on sewer systems and some on water works and sewers; about half of those named were water works; has made an estimate on the reproduction of the present distributing plant of The Denver Union Water Company; covers distributing system only, and the finished result is $3,331,552.09; this is made up as follows: For furnishing and installing 427½ miles of cast-iron water mains and specials, complete, $2,309,502.29, to which is added extra expense of shoring, pumping, blasting, $25,000; valves and hydrants, complete, in place, $289,771; wood-stave pipe and steel pipe, $21,447.80; cutting and restoring paved streets, $258,831; river crossings, ditches, railroads' crossings and other obstructions, $102,000; tools, $28,000; interest, $21,000; liability, insurance and contractor's bond, $32,000; unlooked for conditions, miscellaneous expense, $20,000; profit and office expense, $215,000; last item is estimated at 7 per cent; used current prices on material and cost data on jobs of similar nature; took the quantities and character of material from the estimates of Metcalfe and Anderson, in Exhibit C.

Three-inch pipe weighs 16½ pounds to the foot, and cost per ton delivered on job is $30.50; this includes fifty to sixty cents for hauling the pipe; present market price is $1.50 under this estimate; that

would cut the estimate down $80,000 on the one item. Cost of lead and jute per foot is 1.3 cents, lead at 41½ cents a pound, jute 5 cents a pound; trenching and backfilling, 7 cents per foot; pipe-laying and testing, 2 cents per foot; extra lead and specials, special castings, 3 per cent of the cost of the pipe, being three-quarters of a cent per foot, making a total cost for the three-inch pipe, per foot, of .3627.

Exhibits 59, 59-*a* and 59-*b* were marked for identification; the two tables attached to Exhibit 59 cover the various sizes of cast iron pipe set forth in Exhibit C, and the laying thereof.

Arrived at the second item in Exhibit 59, "Extra expense of shoring, pumping, blasting," etc. on an assumed basis of fifteen per cent of the total pipe laid; listed all the valves and hydrants as shown in Exhibit C; estimated the cost at $283,771; the hauling, placing and extra lead, $15,000; ordinarily, the cost of laying would include the setting of the extra valves.

Witness then reads list of extra valves.

Document marked Exhibit 60 embodies all the tables used in making estimates, introduced in evidence; figured on hand labor for forty per cent of the excavation, and trenching machines for 60 per cent; has been using trenching machines for the last six
904 years; has three at the present time; they do the work cheaper than the hand labor.

At Goodland, Kansas, averaged 2400 feet per day with one machine; on other jobs has averaged 1900 to 2200 feet; 1500 feet would not be difficult average on any job, as far as machines are concerned; this average is on a trench five feet deep, 28 inches wide, and would be sufficient for 60 to 70 per cent of work; has used the Buckeye machine, made at Findley, Ohio, and the Austin, made in Chicago; has used both these machines on trenching work in the city of Denver, from five to sixteen feet deep and 28 inches wide.

Figured on removing pavement three to six inches on each side of the trench; has figured the cost of the material and labor; does not figure excavation by the cubic yard; figures it by the lineal foot; trenching for three-inch pipe is based on seven cents per foot; machine cutting 1,500 feet per day, would cost $25; that covers labor, running the machine, coal, oil, repairs and depreciation; that price is ample to take care of obstructions; took the sizes and weight of pipe used from Exhibit C.

$30.50 per ton is the common price on cast-iron pipe and has been for the last year, f. o. b. cars, Denver; today the price is lower; railroad would deliver at any siding on their line without extra charge; if put on another railroad siding, there would be a switching charge.

On page 8 of Exhibit 60 is a tabulation of lead and jute required per joint; this is considerably higher than all tables give, but experience shows that more is needed; bases estimates on all jobs on the same amount used in this estimate, and it works out in good shape; has made ample allowance.

Arrived at result on page 2, Exhibit 60, for trenching and backfilling per foot, from experience; cost is sufficient to cover the digging by hand; has sub-contracted work many times to contractors at that price; they did it by hand and made wages; at the present

time doing the same class of work, at Casper, Wyoming, at lower prices and more difficult digging; could get better prices in Denver, but prices for pipe-laying and testing per foot is arrived at from experience, and is what this class of work has been done for in other cases; in all of witness' jobs the specials and extra lead has been about three per cent of the cost of the pipe.

The soil and working conditions in Denver are very much the same as the conditions on the work done by witness outside of Denver; it would be cheaper working in Denver, and better ground conditions and better labor conditions.

905 Cross-examination by Mr. Dorsey:

Twenty-nine years old; did not graduate from Cornell; left Cornell in June, 1910; has been out of college four years; has been engaged in the contracting business before he left college; attended college for three years; before going to college was with his father, John R. Gordon, for several years, contracting; headquarters, Pueblo; before going to college, had been engaged in contracting business for three years; began at about the age of nineteen; was estimator and engineer; had had training as an engineer at that time; was with the Colorado Fuel & Iron Company from about 15 to 18, during the vacations; during part of the time went to a technical school in Chicago; experience with C. F. & I. was in vacation time, sometimes carrying a chain, sometimes working as draftman; does not think that experience would fit him to make an estimate upon a distribution system such as that of The Denver Union Water Company; was going to school while doing business with his father, at Lewis Institute in Chicago; would work at times, then go to school; was with his father not only during vacations, but a year at a time; then go to school a year; about half the time during the three years preceding 1907 was with his father; pursued a course of mechanical engineering at Cornell; on coming out of college, settled at Pueblo; headquarters now in Denver; went in business for himself in July, 1910; was only in Pueblo a month and then moved to Western Slope, over in the Grand Junction country; closed office in Pueblo; stayed in Grand Junction until March, 1911.

Was executing a water works contract at the town of Grand Valley; that was witness' first contract; that is a town of 500 people; never had a water plant before; wood pipe gravity system; entire system is 30,000 feet; part of it a conduit line; no cast iron pipe laid; total amount of contract price $30,000; did 30,000 feet of trenching with trenching machines, no obstructions.

Shortly after that stopped a little while in Pueblo, then came to Denver; came to Denver in the spring of 1911; at once opened an office here; engaged in business on own account; would not say that he had done all the waterworks construction which has occurred in Colorado and surrounding states during that time, but a great deal of it—more than any other one; thinks he has done practically all of it in Colorado.

Beginning with the spring of 1911, witness has had following contracts: Fort Logan, Colorado, in May, 1912; sub-contracted at

Milliken, Colorado, and Johnstown, Colorado, in July, 1912; sub-contracted on some Denver work in July, 1912; water works at Minturn, Colorado, in fall of 1912; pipe line for Public
906 Utilities Commission in fall of 1912; Scotts Bluff, Nebraska, February, 1914; from November, 1912 to February, 1914, did no water works construction; worked on sewers; at Goodland, Kansas, May, 1914; Simla, Colorado, July, 1914; Mead, Colorado, July, 1914; Raton, New Mexico, assignee of contract, June, 1914; Casper, Wyoming, September, 1914. Grand Valley has a population of 500; total contract price was $30,000; Fort Logan contract price, $2,500; laying water mains; furnished some of the material; town furnished some material, six-inch cast iron pipe; some smaller galvanized pipe; total length of trench was 7,500 feet; trench was five feet deep, two feet wide; no obstructions; laid some supply pipe from small reservoir down to the center of the Post; pipe was from two to six inches; bought less than a carload of pipe; paid $35 to $40 a ton f. o. b. Fort Logan; sub-contract at Milliken covered digging and trenching. Contract price about $2,500. 32,000 feet; five feet deep, two feet wide; had nothing to do with backfilling; paid 6 cents per lineal foot; used machines entirely; no obstructions encountered.

On the work for the Public Utilities Commission O'Brien was the contractor, and witness sub-contracted; covered trenching only; no laying or backfilling; very few obstructions, but went parallel with them; did 5,000 feet at 7 cents a foot; price $350; used machines; about five feet deep by 28 inches wide.

At Fort Logan the work included backfilling and laying of the pipe; does not know the total cost of the material furnished at Fort Logan by the witness.

Minturn has about 500 people; constructed entire water works; pipe system; short gravity line of wood pipe, four to eighteen inches; 15,000 feet of trench; contract price, $20,000; included a small reservoir, which cost $1,000; conduit was about two miles long; part of it was 18-inch; about six or seven thousand feet of distribution system; practically all rock work; no trenching machines.

Contract for the Public Utilities Commission in November, 1912; covered the whole job of excavation, laying and backfilling, and furnishing material; total price, $2,600; trench between three and four thousand feet long, five feet deep by 28 inches wide, of six-inch cast iron pipe; purchased and supplied the pipe for $33, f. o. b. Denver, and paid cost of unloading from the cars, additional handling and conveying; hauled the pipe from siding down by Overland Park; had to haul to the other side of Washington Park; did not pay the freight; covered one or two carloads of pipe; freight paid by Hendrie & Bolthoff Company; pipe came from C. F.
907 & I. Company at Pueblo; did the trenching with excavating machine, No. O Austin; did no more hand work than is customary with the machine; where one must raise up for pipe, cross-work and street-car tracks, hand work is customary; had a gang of four or five pick and shovel men to get the machine over obstructions, and dig bell holes and clean the trench after the machine; the pipe was six-inch, Class B, cast iron, American standard; weight,

33 1-3 pounds to the foot; made $300 on the job, after taking out all overhead, including office, administration and other expenses; divided the overhead up with other jobs; might have stated that he lost money on the job; probably stated that he would not figure on another job at the same figure; really made a sufficient profit for the size of the job; after a job is over, generally states that he lost money on it; thinks that is correct policy; don't know how long the job took.

At Scotts Bluff there are about three or four thousand people; had contracts for extensions of distribution system, for a lump price of $15,000; about 22,000 feet; extensions to be made in the outlying parts of the city; contracts covered excavation, furnishing material, laying of the same and back-filling; pipe was from four to eight inches; major part was four-inch; trench five feet deep by 28 inches wide; work done entirely with trenching machines; not many obstructions. Very sandy and cavey digging; had to sheet about half of the trenches; it was bracing, not tight sheeting; in some place would not hold long enough to let the machine go through.

On the contract of November, 1912, with the Public Utilities Commission, encountered eight or ten obstructions in the total length of three to four thousand feet.

Goodland is on the prairie, in the western part of Kansas; has 2,500 people; job was replacing old system; took the job at price of $26,000; laid four or five thousand feet of water pipe, putting in small booster pump. No supply pipe or conduit; pipes were from four to ten inches; Mathewson joint, steel pipe; did the trenching with trenching machines entirely; five feet deep by 28 inches wide; great many old pipes to be encountered; laid the pipe in trenches parallel to the old pipe; only encountered old pipe in crossing; encountered service pipes; cannot say what is material cost, or allowance for overhead and profit; $22,000 is as near as he can remember it. There were 45,000 feet of trenching; made 10 per cent on the whole job; did not figure that much; that profit was made after providing for overhead; considers that an unusual profit; engaged about 25 to 30 days.

Simla, Colorado, is east of Colorado Springs, on the Rock Island; has 200 people; furnished all the labor connected with the
908 pipe work; laid the pipe, dug and back-filled the trenches; material was furnished at the car; total contract price, $850; there was some extra work; trench was five feet deep by 28 inches wide; total length 11,000 feet; did work with trenching machine; pipe was four to six-inch cast iron pipe; contract covered hauling from the car to the job; average haul about 2000 feet; there was no obstruction to the trenching machine; made about 1,400 feet a day; kept machines there about 12 or 14 days; five or six men in a gang with a machine; in doing work in a place where obstructions were encountered, would need more men.

Mead is near Greeley, on the Sugar Belt line; has about 300 people, water works consisting of single reservoir and pipe line to town and distribution system; did work for lump price of $8,500; reservoir 80 feet square; earth embankment, lined with concrete; mile

and a half of six-inch wooden pipe conduit; trench five feet by 28 inches; 5,000 feet of distribution pipe; same size trench; distribution pipe of wood, varying from four to six inches; no cast iron pipe or iron pipe used on the job; used a trenching machine; machine arrived August 1 and left 10th or 13th of September; took about three months to do the job; cannot remember the total bill for materials; it was between five and six thousand dollars. Made a profit of $1000 on the job; overhead had to come out of that; after taking out overhead, interest during construction, maintenance of permanent organization, thinks he made about $700 net profit; figured on 10 per cent net profit; is not customary to figure 10 per cent profit on material; figures on profit based on time to complete a job and the risk involved; in buying material merely acts as purchasing agent for the city, and has not seen fit to put large profits on; never adds any fixed percentage in buying material; profit is figured on the work.

Four-fifths of the job at Mead was material; figured on making 10 per cent on the whole job. On that assumption, the profit on the work at Mead would be about fifty per cent.

Casper is in the central part of Wyoming, on the C. B. & Q. and Northwestern railroads; has about 6,000 people; witness' contract was for extensions to the present system, and a gravity flow-line to town; bid a lump price of $73,000, and is now engaged on the work; had two contracts there; began on the sewer on October 12, 1914; completed the sewer and then went on the water works; $73,000 was bid on the water works. Has practically completed all the pipe work; conduit was 16,000 feet of 12-inch Mathewson joint steel pipe; trench was five feet deep, 28 inches wide; contract included the laying of the pipe, trenching, supplying the material and back-
909 filling; no obstructions; about 35,000 feet of distribution system; pipe 15,000 feet of 8-inch and 15,000 feet of 4-inch, the balance 6-inch; no extras included to date; has met obstructions in the ground and sidewalk; no obstructions except where old pipes were replaced with new; a few private lines and service pipes from the old system; had railway crossings and telephone conduits to cross; no paved streets or street railroads; no gas works; will encounter steam heating pipes; used excavating machines to a great extent; used a machine on the conduit line, but it required considerable hand labor, owing to sandy nature of the soil, which is like wheat and has no moisture in it; has used machines on the distribution system, practically all of it to date—at least 30,000 feet out of the 35,000; had one machine at work; began about the middle of November; does not excavate any faster than can lay pipe; machine is still there at work; will finish before Christmas.

It was called to the witness' attention that all the work he had done aggregated $181,300, and he was asked whether that justified a fair foundation for his statement that he had done practically all of the water works construction in Colorado and neighboring states within the time specified, to which the answered, "The greater part of it." Knows that the water company is now engaged in an addition to its plant, involving twice that sum of money; witness' work has been

done for municipalities, not private companies; water company would not consider his bid on its work.

The Raton contract was let in January or February, 1914; witness became connected with it in June, 1914; original contractor is witness' father, J. R. Gordon. Raton has between five and six thousand inhabitants, on the Santa Fe railroad; is a water plant there already; witness' contract was with the city; the object is to construct a competing plant, to compete with the city. Mr. Hiram Phillips is the consulting engineer on the work; witness' contract is mostly for the distribution pipe system, and contemplates a lump sum; price is somewhere over $100,000; covers 10 miles of cast iron pipe, from 6 to 12 inches, sub-contractor furnishes the material; Mr. Taylor has been handling that job; helped Mr. Taylor prepare the bid for it from the estimated prices given by J. R. Gordon; conduit from the reservoir to the city is not covered in the $100,000 price; trench would be five feet deep; total length of pipe and trench is fifty odd thousand feet; contract is practically completed; has put in about three miles of 12-inch cast iron pipe, balance mostly 6-inch, American water works standard; very little 4-inch pipe, except the hydrant connections; has a copy of the original, and is asked to bring it in.

910 In Raton, paralleled the pipes of the privately owned pipes in practically all cases, and laid some pipes in new parts of the city; used trenching machines on some of the work, but not all; there are no paved streets in Raton. There are a great many underground conduits or obstructions in the streets, shallow sewers, above the bottom of the water pipe trench; that is an unusual condition; encountered house connections; sent trench machine to Raton about the middle of June; it is still there; has worked continuously there since June; temporarily suspended upon the distribution system. Mr. Taylor is looking after another part of the work; the machine is not working; has been lying idle for a month or two months; practically all men are away from there. Mr. Taylor is looking after the conduit line from the reservoir of the old company; assumes that the town has seized the old reservoir; paid $30 or $31 per ton to the C. F. & I. for the cast iron pipe used on the Raton job, f. o. b. Raton. The work now being done at Raton is as a sort of associate with J. R. Gordon.

Has had several sewer contracts in Denver.

Witness describes some sewer jobs; the amounts involved in the sewer jobs are as follows: Olathe, $16,000; Fort Lupton, $15,000; Sidney, Nebraska, $22,000; Scotts Bluff, $17,000; Fowler, $18,000; Montrose, $35,000; Casper, $14,000; that the aggregate of those is greater than the amount of sewer work done in the city and county of Denver; did the University Park sewer job in July, 1912; total length of sewer, 17,000 feet; trench varied from 5 to 14 feet in depth, 28 inches wide; vitrified clay pipe was used; contract covered excavation, material, laying of pipe and backfilling; total contract price between $10,000 and $15,000; an 8-inch sewer was 42 to 43 cents a foot, including everything; does not remember what part of the price for the sewer represented material.

In September, 1912, built Park Hill sewer, 4,000 feet; total price, $3,000; 8-inch vitrified clay pipe used; trench 7 feet to 17 feet in depth, 28 inches wide; unit price 48 cents per foot, including everything.

In November, 1912, built a private sewer for the Clayton College; total price was $400; unit price 42 cents; trench 7 feet deep, 28 inches wide; pipe 8-inch vitrified clay pipe; next built a sewer for the House of Good Shepherd, on private contract; total price, $2,000; 4,000 feet; unit price 42 cents a foot; 8-inch sewer pipe; trench was 7 feet deep and 28 inches wide.

Next was city work, on a sewer in University Park, in April, 1913; total contract price, $13,000; 17,000 feet; unit price
911 44 cents per lineal foot; trench 14 feet deep, 28 inches wide, mostly 8-inch vitrified clay sewer pipe.

Next work was in north Denver; around Manhattan Beach; 40,000 lineal feet of mostly 8-inch vitrified clay pipe, some 10-inch and 12-inch; total price $26,000; unit price 46 cents per foot.

Built small pieces of sewer, from two blocks up to two miles, in several different places on the north side. Put in 1,200 feet of sewer for the Pinhorn warehouse; $500 total price of the sewer; total price of the sewer work done in Denver by the witness is $59,400.

The North Side district was fairly well built up, but the major part was around Manhattan Beach, which is not built up; encountered a 30-inch pipe of the water company on some of the work; ran parallel to it for some ways, about 20 feet away; did not disturb the work; thinks it was leaking, and that the water bothered a good deal. Is not sure that water was coming from the water pipe; was in the neighborhood of the lake and the underground drainage is toward the lake; might have been that drainage; encountered gas pipes.

Most of the other work was done on wide and unobstructed roads; no paving or street car line to any great extent; no underground conduits or pipes to be met with. The vitrified sewer pipe is much less expensive than the cast-iron pipe; figures on a trench narrower than 28 inches for the most part in reproducing the distribution system.

Witness' total work in Denver is $62,850, about fifty per cent of which represents material; this leaves $30,000 to cover actual trenching, laying and backfilling.

Witness first took up the question of making his estimate on The Denver Union Water Company plant last July; worked at it about two or three weeks, and had a man on it constantly working under witness' direction; witness gave about half his time; witness had before him the quantities listed in Exhibit C; had access to Class S, distribution pipe system, pages 365 to 390 in Exhibit C; had also the exhibits in the back of the book relating to Class S; witness' estimates cover all the items so shown in Exhibit C; did not assume that the pipe would be put in the same location as the present pipes of the water company; assumed that the reproduced plant would parallel the present plant; pipes would be to one side of the car line; would not put pipes under the street car tracks; added nothing to

estimate on account of difficulty of placing the pipes in those locations; knows that Metcalf and Anderson included such an item; witness excluded it; included nothing for service connection, and knows that Metcalfe and Anderson estimated them; did not
912 take the property listed and described in Class S in Exhibit C, but made some changes in it for the purposes of valuation; knows of no other changes than those mentioned; had no maps, plans or cross-sections before him; knew that full and detailed plans were in the water company office; did not think it was necessary to have recourse to them to prepare an estimate; estimate is based on laying that amount of pipe in the streets of Denver, paralleling the water company's lines.

Witness did not take the specials listed in Exhibit C, but estimated the quantity, which he thought would be sufficient.

The exact length of the work done for the Utilities Commission was 2,692 feet of 6-inch cast-iron pipe, and the total contract price was $2,610, and at the end of the contract there were $128 in extras added; that makes an average price of that work for trenching, furnishing the pipe, laying and backfilling, for 6-inch pipe, 82.2 cents per foot; witness states that he lost money on the contract, and afterwards, when bidding on the Mississippi Street job, witness may have stated that because of his experience he would not take another job at the same price, but the Mississippi Street job was a more difficult job—crossed under several railroad tracks and street car tracks, and there was rock.

The unit price for the 6-inch pipe on the Public Utilities job was 88.2 cents per lineal foot. The unit price placed on 6-inch pipe of like character, per lineal foot, on the same character of work in witness' present estimate is 72 cents, and the obstructions on the reproducing of The Denver Union Water Company's pipes to be encountered in the street are enormously greater than those encountered on the job done for the Public Utilities Commission.

A large part of the estimate embodied in Exhibit 60 is the cast-iron pipe; witness assumed the cost of the pipe, f. o. b. Denver, to be $30, and added 50 cents for hauling to the trench and handling out of the cars; $30 per ton f. o. b. Denver was the price of pipe during all the summer. The price is lower now. The basic price is $16 per ton at Birmingham; the freight is $12.50 per ton; the price has gone down since estimate was made; used the figure that witness would have to pay for the pipe; thinks could make a contract for 60,000 tons to be delivered within the next two years, f. o. b. Denver, at $30 per ton. Has never bought pipe in that quantity; does not know whether an order of that size would have a disturbing effect on the market; cast-iron pipe fluctuates widely in market price; his schedule, or his Exhibit 60, contains prices from 1904 to 1914, f. o. b. Denver; all except the last one secured from the C. F. & I. The C. F. & I. makes about 9000 tons of cast-iron pipe
913 a year; would not expect to get 60,000 tons from the C. F. & I. unless they increased their facilities; thinks could get the same price from distant factories.

The average price, on page 9 of Exhibit 60, from year 1904 to

1914, inclusive, would be $32.70 per ton f. o. b. Denver; asked Mr. Chilberg of the C. F. & I., and he stated that The Denver Union Water Company got a reduction from the regular prices; witness does not think that the average price paid by The Denver Union Water Company for the last ten years has been $33.40; is not aware that Mr. Gaffy made an estimate, and used a unit price of $32.55 per ton f. o. b. Denver on three to four-inch pipe, and $31.50 per ton on 6 to 20-inch pipe, and $32.50 per ton on 24-inch pipe and larger; does not consider cost to The Denver Union Water Company in the past; about three-quarters of witness' estimate consists of cast-iron pipe; does not think any error was made in taking present-day prices; does not think the prevailing high price of labor would offset the prevailing low price of materials; has estimated an average haul of two and a half miles; did not go into the points from which it would be hauled, very carefully; there are several sidings; assumes that the railroads will set the cars on various sidings; thought of using siding by Zang's brewery, on the C. & S. or Santa Fe, one at Overland Park, on the Santa Fe or D. & R. G., and one at 36th and Walnut, on the Union Pacific—Union Pacific roundhouse and shops; siding at University Park, on the C. & S., and Globeville, on the C. & S.; regular wagon tracks at the depot; has taken it up with the railroads, and they will deliver the cars to sidings, at a distance from the depot, on their own trackage property; at points indicated by witness; got the information from Mr. Morehouse of the freight department of the Santa Fe, and he said it would be the policy of the other roads; witness has gotten cars set in that way himself; has not included any estimate for switching the pipe to various parts of Denver; has only added the line haul freight rate; would handle the pipe from the car to the trench by wagon; unload it directly from the car into the wagon; would hold the car until the pipe was needed; would store the pipe by unloading it along the trench; would have a great deal laid out along the trenches; estimates a period of two years for the construction work; eight or ten months per year; figures on three-quarters of mile a day, or 24 miles a month; does not think could get 25 miles of pipe on hand; thinks a margin of twelve and a half miles of pipe could be arranged, and that the city would permit it to be strung out; has never heard of it done in that magnitude; has never heard of a job of that magnitude.

914 The rate of progress is smaller on larger sizes. Most of the pipe is small, and would travel at a greater speed with that to make the average.

If witness had to store pipe, could store it on lots without expense; does not think it would be necessary to store the pipe.

In opinion of witness, it is not necessary to provide for handling pipe from the car to the store yard and from the store yard to the wagon or other means of transportation; has allowed 50 cents per ton for hauling pipe; that is the price witness pays wherever he has contracts; has never had a job on which the average haul would be two and a half miles; coal people get 50 cents per ton for hauling coal in the city, to Colorado Boulevard; they can make money on

the maximum haul of three miles; has talked with people in the hauling business, and is basing his statement on that.

On the Public Utilities Commission job in 1912, hauled pipe from near Overland Park by horses and wagons; did not keep a record of it; cost considerable because it was a small job, and there was no tackle to unload with; average haul was not near two and a half miles; has used a tackle on other jobs; never kept account of what it cost to unload; has based estimate on the use of horses and teams; motor trucks would probably be used; team would haul ten loads, with an average of two and a half miles; made a mistake in that answer; would haul three tons to a load; has not figured how many loads a team would haul in a day; did not figure it in connection with the estimate; witness' judgment is 50 cents per ton; thinks a team would haul four loads—ten miles loaded and ten miles unloaded; allows but a few minutes to load and unload; loading takes longer; when unloading, material is distributed along the trenches; two men could unload on the average all the way through—driver and helper; would have the helper at the ditch to help unload; the larger sizes would require more men; man who drives the team would help loading and unloading.

On the smaller sizes would have to have two men; on the larger sizes would have a derrick, but would have another man. The two men that would be necessary all the time would cost $5 per day, and the team would cost $5 per day; one horse to operate skip would cost $1.25 a day, which would be $11.25 a day for each wagon; did not go into any of these details in making up estimates; all depends on the kind of material to be loaded and unloaded; does not know the cost per ton-mile of hauling iron pipe; estimated 18 cents per ton-mile; on the average haul, this would make 45 cents per ton for hauling, and would have five cents left at either end, and thinks that is adequate.

915 When witness was asked if he knows what Mr. Gaffy's estimates are for handling material, and per ton-mile of haulage, (counsel objected and objection was sustained.)

Witness thinks fair allowance for specials would be three per cent of the total cost of materials; was not aware that the specials were all listed in Exhibit C; did not pay any attention to it; specials are not a hard matter to figure. In attempting to reproduce the property, it would be necessary to reproduce the items listed; specials estimated by witness are sufficient for that amount of pipe; did not make any effort to determine the sizes, quantity or character of the specials actually in the system; on witness' basis, the specials, with the addition of profit, amounted to $58,895; estimated $50 a ton, which is the present-day quotation on such articles; that is the price quoted by Hendrie & Bolthoff and the C. F. & I. Company; has not talked with Mr. Chilberg on this estimate; had prices on other jobs recently.

On December 1, got an estimate on water works job in Wyoming; that estimate was $60 per ton; witness thinks he has quotations f. o. b. Denver, gotten for the Raton works; witness was asked whether he had not talked with Mr. Chilberg with regard to the price on special castings of $50 per ton, and whether Mr. Chilberg did not say that that price was an abnormal one, growing out of the unusual con-

ditions at the mills; that it must not be used in the Denver rating case, because it was not a normal price or a fair price for the cast-iron specials, (to which counsel objected.)

Witness indicates a desire to answer the question. Says Mr. Chilberg did not give any quotation on special castings; had such a conversation on pipe only, and made such a remark as counsel indicated. When witness asked Mr. Chilberg for the price on the pipe, and was given $30 f. o. b. Denver, the conversation such as indicated by counsel took place over the phone—that is, that the price was abnormal, growing out of the unusual conditions; must not be used in the Denver rating case, because it was not a fair indication of the normal price, or fair price for cast iron pipe f. o. b. Denver; in other words, was not a price under which the mill could do business and continue in business; witness increased the price. The conversation of Mr. Chilberg was the Birmingham price; the price of $30 may have been the price mentioned to Mr. Chilberg, and Chilberg made the remark in question with respect to that price. Notwithstanding that, witness has used it as a basis. The price on specials bears a definite relation to the price on pipe, and when pipe is below $30, the specials are $50. For the purposes of this estimate, the pipe ought to be higher than $30 per ton, and the specials higher than
916 $50 per ton; is not aware of the actual price that the water company has paid for specials.

(When witness was asked if he did not know that the water company had never paid less than $60 per ton, and that the price varies from $60 to $80 per ton, counsel objected, and the objection was sustained.)

If witness had known that the water company during the last ten years, has been obliged to pay not less than $60 per ton for specials, and from that to as high as $86, it would not affect his judgment; admits that he takes the present-day prices on the present depressed market as his basis for the estimate.

Intends to do about sixty per cent of the trenching by machine and forty per cent by hand; would employ both Buckeye and Austin types of machines; thinks machines would dig up to 42 inches; the trench would vary in accordance with the size of the pipe; the ditch would have about six inches on each side, making a 24-inch trench for a 10-inch pipe; those machines cost $6,500 for a No. 0 trencher and $5,000 for the 2-0, at the factory. The freight would be $300 on the small one and $500 on the large one; would have the labor of setting up after it arrived here, and transporting it to the point where it was to be worked; the rate of progress would be a thousand feet per day, on the average, equal to about 500 cubic yards; would have an engineer and fireman; pay the engineer $5 a day and the fireman $3 a day; it would cost $5 a day for fuel; repairs would be $2 a day; the cost of running the machines is estimated all over the country at $25 a day; machine is good for ten years; used $5 a day for depreciation but has not segregated interest on the investment; $5 a day would not write off the machine in two years; would keep on using the machine; would use six machines on the job; witness now has three, and would add three more; would require an additional gang with the machine; usually run along about eight or

ten men, in addition to the engineer and fireman; pay the additional men $3.50 per day each; that would add about $25 to the daily cost of the machine; the items given aggregate $45.50 per day. The $25 for the eight men cannot be added to the machine cost; the forty per cent of hand work would be the part that the machine never passed over, and the part that the machine passes over would cost $45 per day; estimates 60 per cent of the work could be cut with a trenching machine; forty per cent would be by hand work, but one-third of the forty per cent would be done by a machine.

Wishes to correct impression of previous testimony as to the gang with the machine: there are only two men with the machine—the engineer and the fireman; the other men are for digging bell holes, shoring and other work in back of the engine—mostly on the
917 pipe gang—and were additional expenses that witness has allowed for shoring and crossings, digging out crossings where the machines are raised over. The gang bringing up the pipe in back of the machine takes care of the hand digging, cleaning out bell holes, caving, and like matters; don't charge all of that work to the pipe; charges it to the producing of the ditch; and that is what estimate allows; if allowed only the estimate of digging the ditch with the engine, it would be about two and a half cents a foot for the machine part of it. The expense of the hand laborers following up the machine is charged to the cost of digging and backfilling the trench, and part of it is assigned to the machine expense and part to the hand work; would have eight men in the gang, close up to the engine at all times; the pipe-laying gang would be about six to eight men, and there would be about eight diggers, making sixteen men; one calker has made 2,100 feet per day on the Casper water works, and stood pressure of 200 pounds, with no leakage; that was Mathewson joint pipe; requires a little less lead. On 12-inch cast iron pipe a thousand feet would be easy throughout the season, every day in the year; calkers' pay is $4 a day; yarning man gets $3 a day.

The two men lowering pipe would be paid $2.50 per day; lead men, $2.50; jointers, $2.50, and the same wage for two additional men; the trenching machine fuel would cost $4 or $5 a day; figures that one-third of the estimated machine trenching will have to be done by hand, and that one-third of the estimated hand-trenching would be done by machine; a gang would make progress of about a thousand feet a day; on the hand excavation would have about 34 men in his gang; this would be on the estimated hand work where the machine would be used; on the estimated hand work where no machine would be used, there would be 30 laborers in addition to the pipe gang; they would make about 1,000 feet a day in the congested district; all these men would be paid $2.50 a day; would have a foreman with a complete crew, which would cover the men working on the trenching machine and the men working on the pipe; figures on six crews; would have six trenching machines, but part of them would be idle part of the time; in estimate, assumed that six trenching machines would work constantly two seasons or a total of 440 days; has not estimated the time it would take to do the trenching machine work; would probably have hand work going on concurrently with the machine work; there would then be more than six

gangs at work concurrently, would get through sooner; assumed that 6,000 feet would be completed per day; would use six foremen, at $5 a day; timekeeper and three superintendents, and office force of three clerks, who would be bookkeepers and stenographers,
918 and one telephone, and have a watchman at the material yard; would not need a force there; would not have a telephone and office there; would pay the clerks $150 a month; witness and his partner would do most of the purchasing; the profits on the job would cover that; would not charge the job with the partners' time; to that extent, the so-called profit would be wages.

The superintendents would get $175 a month; would have no engineering assistance; has made allowance for contingencies in Exhibit 60; would do backfilling with teams and scrapers; one team and driver can fill 750 feet a day; would have one team for small errands; would have two teams following up each of the six gangs, and have two men to do the necessary hand work on the backfilling; afterwards the trench has to be leveled off; about three-quarters of the distance would have to be flushed with water; would pump the water out of the river and put it into the system; would maintain a pumping plant for that purpose; would have to pump part of it against considerable head; has not made a separate estimate of the pumping outfit; the owner furnishes the water; usually the owner hasn't any water until his plant is finished.

Knows of no case where the owner has furnished the water except in case of extensions of old systems; would test it before it is backfilled, and would have to leave trench open between gate valves which occur every three blocks; would have the hydrants set before back-filling, and put the hose onto the hydrants; would have to keep the pumping plant operating continuously; the main pump would only be sufficient to put water into the mains; would require a small additional pump to test the pressure; would have to furnish water to make the tests, and would have to have a continuous supply for backfilling; cannot say how much was allowed for this pumping system; two laborers, two scraper men with their teams will do the backfilling; don't tamp when water is used; tamping is not as good as water for putting in backfilling; does not know what the city requires in that respect in the congested district.

In Exhibit 60, page 1, there is an item "Extra expense of shoring, pumping and blasting, $25,000", and this covers lumber in the shoring and the additional expense of blasting and the pumping of water encountered in the trench; in some parts of town there would be blasting; the blasting would be a small item; there is some soft shale and sandstone. That statement is based on witness' observation in built-up sections. Figured on a total of 340,000 feet of blasting, shoring and pumping; did not divide it into separate items; allowed 7½ cents a foot on fifteen per cent of the total trenching to cover those items; it costs 80 cents per lineal foot to handle the rock; it would cost 5 cents per lineal foot for bracing or
919 timbering; in the congested part of the city would use upright braces, spaced at intervals; some of it would be tight; would make a trench on 16th or 17th Streets that way.

Witness considers his allowance adequate. On Exhibit 60, page 1, the item of $258,831 for cutting and restoring paved streets should be increased by an allowance of seven per cent for profit and office expenses; has given the details of the cutting and restoring pavements on page 6 of Exhibit 60.

Exhibit C sets forth in detail the exact character and quantity of the pavement to be cut; followed Exhibit C as to the lineal feet of pavement to be cut, but does not know whether he followed it as to the width; aimed to make the cut sufficient to install the pipe; assumed that the cut in the pavement would be 12 inches wider; page 6 of Exhibit 60, column headed "Width of trench" is intended to specify the width of the cut in the pavement; in each instance the cut for the trench would be 6 inches to 12 inches narrower; on using the first item on page 6 of Exhibit 60, as an example, it appears that the outside diameter of a 12-inch pipe is 14 inches; adding 12 inches for extra width makes 26 inches; the cut in the pavement specified is 30 inches, thus allowing four inches extra width of pavement cut; there would be an excess on the smaller sizes, and the average would be right.

Six-inch pipe is the predominant pipe in the distribution system; figuring the width for that pipe, it would be 8 inches in outside diameter, plus one foot for trench room. Deducting the 20 inches so obtained from the 30 inch estimated width of pavement cut, would leave 10 inches. Most of the downtown district would be cavey, and the width of the trenches would have to be increased as a margin of safety. In good ground the trench would not need to be 12 inches in excess of the pipe diameter, so that witness' average allowance of 12 inches would average up; has never done any work where it was necessary to cut and relay the pavement; in Exhibit 60, page 1, item of tools, $28,000, covers cost of trenching machines, pumps, wagons and scrapers, and hand tools, and plants of every description furnished by the contractor; the actual cost of six machines would be $36,000, but witness has three machines of his own; would not charge the full cost of the machines to this particular job; thinks the machines will be worth half their value at the end of the job; has one machine which has done as much work as any one machine would do on this job; has had that machine two years, and has dug close to 75 miles of trenches; most of it was deep digging and harder than this job would be; on this job the pipe to be reproduced would lie in nearly every street of the city; witness' knowledge of the city was such that he did not need
920 to dig test holes. A stranger bidding on the job might have the expense of making the tests, and that would be a considerable expense. Could get a good knowledge of conditions with an expenditure of $1,500, but could spend more. A few hundred dollars would be sufficient to buy loading and unloading apparatus. Thinks between $500 and $1,000 would cover that expense. Had in mind a new machine called the Beaumont, worth $1200, which could be used for backfilling and unloading; would not need one of these machines with each gang; could move it around, unloading the pipe from wagons into the bottoms of the trenches by rolling

it down ropes; tripods for lowering pipe into the trench would be inexpensive; would have some small hand pumps; $2,500 would be sufficient for pumping station; $4,000 would cover all the small tools; did not figure on motor trucks or horses and wagons; would have stuff transported by local teams; would sub-contract the transportation; does not expect to make anything on the transportation part of it; would use a Ford automobile for his own transportation; would not use road rollers; has mentioned all contractor's equipment that would be necessary.

On page 1 of Exhibit 60 appears item $53,000, made up of interest $20,000, liability and bond, $32,000; witness estimates it will require $150,000 cash capital to carry on the work for a period of two years; does not know what part payments would amount to each month on the average; would be paid eighty-five or ninety-five per cent of contract each month in installments; does not know that the statute requires the withholding of fifteen per cent; thinks the monthly payments would include not only work done, but pipe on hand; made no provision for possible delays in payment, or that ten or fifteen per cent of the entire contract price would be withheld until thirty-five days after the completion of the whole work; would expect to get full payment ten days after the work was completed.

The interest on contractor's equipment is taken care of in the price per foot; interest on equipment would be taken care of in the estimate of $28,000 for tools; the interest on contractor's borrowed capital is figured at 7 per cent for two years; the interest on the amount invested in tools would be a small item; $3,000 would cover the interest on money invested in equipment, and that is covered in the $28,000 item, so that actually the real cost of tools and equipment is $25,000. Computes the interest on investment of $14,000 in equipment. Now has three trenching machines and would buy three more. Proposes to allow interest on the capital now
921 invested in machines. The old machines and the new ones would represent $35,000 capital today; would compute fourteen per cent on that; the witness meant to say that the interest would be $3,000 on present equipment; has not figured the interest on the entire equipment which would be used or provided during the two-year period; would expect to receive monthly payments on pipe laid and pipe purchased and delivered but not laid; that is customary, and has been done on all the witness' contracts except the one with the Public Utilities Commission. Referring to Subitem "Liability and Bond $32,000," it includes bond given by the contractor to the water company; that would be one-half of one per cent of the contract, or a little over $15,000.

Would carry employer's liability insurance policy and a public liability insurance policy; these two together would amount to three per cent of the total payroll for the whole period; the labor item would be $450,000 on the whole job. Has estimated $16,000 for the premium on those two bonds. Such policies are limited liability policies. Has made no provision for damage claims in excess of that liability, except in the item of contingencies; the $20,000 in that item covers possible loss; does not know whether the insured

company would need an attorney to defend damage claims; the contingency item is about six-tenths of one per cent. on the whole job, and covers all unlooked for conditions and contingencies. The item of seven per cent. profit and office expense equals $215,000; it is, in fact, 6.92 per cent; would expect a profit of at least $200,000 for the contract, and total office expense would be $15,000, covering office rent, compensation of office employes, time keepers, auditors, telephone expense, yard expense; thinks that is ample.

The contractor continuously maintains an office and is under expense; this must be paid out of the contracts which he gets, and the $15,000 estimate covers that; would take this contract for a lump sum of $3,331,000.

The contingency item would cover any additional expense in encountering unexpected character of ground and unexpected obstructions; thinks such things may be so definitely anticipated that six-tenths of one per cent of the whole job will cover them.

Redirect examination by Mr. Stevens.

Witness stands ready to take the contract at the lump sum price indicated. Experience is that when one is ready to make a contract to buy cast iron pipe, it can be secured at fifty to seventy-five cents under the quoted price.

A quotation holds good for thirty days. In talking with Mr. Chilberg, witness had the Birmingham quotations and was
922 talking with him about them; was discussing with him the $28.75 quotation; Chilberg did not give a quotation; witness raised the Birmingham quotation $1.25. At Raton the system of pipe being put in was parallel to the old water works system, and the city has sewers and cross-walks, and the old pipes go into every house and sewer; these were encountered; the sewers were shallow and caused great annoyance, all of which he has allowed for in this case.

One of the witness' trenching machines has dug approximately 75 miles, mostly sewer ditch, quite deep; is in very good condition and will dig several times that. At Casper the city put in a temporary pumping plant which pumped 200 gallons per minute and cost $600; it is a direct connected engine to a four-stage centrifugal pump, pumping against a head of 300 feet; 200 gallons a minute is more than would be required on the Denver job. The difference between that sum of $600 and estimate of $2,500 covers operation of the pump.

If this work were done for the City of Denver it would furnish the water; witness' bid for 2600 feet of trenching for the utilities commission was higher than the present estimate, because that work was done in three different places, the ground conditions were bad, and there was water; this condition was known when the bid was made; 3 street car tracks to cross, and the organization expense was greater for the small job; based present estimate on a wage of $2.50 per eight-hour day for common labor; at this wage can get the pick of men, and it works out better in the long run. The hazard on this job would be small compared to other work, and considering the fact that a

larger part of the bid would be for material, $200,000 would be ample profit, and all the job would allow on competitive bidding. The large quantity of material needed would have a tendency to permit purchase at lower price than for smaller amounts. Expense of moving machinery is heavier in proportion on a smaller job than on a large job; has estimated on an average haul of two miles and a half. If the average haul was shorter, witness' estimate would be too large. Exhibit C does not go deeply into condition of soil, but witness has taken the same quantities as shown in Exhibit C.

The item of $25,000 for shoring, pumping and blasting is an estimate of possible costs in addition to the unit prices. This estimate is based on the statement in Exhibit C that there would be a certain number of linear feet that would require extra work.

Recross-examination by Mr. Dorsey:

Witness omitted some of the work involved in reproducing distribution system as given in exhibit C.

923 Made his own estimate in respect to specials and in other respects appearing in the cross-examination; did not follow Exhibit C. Attention is called to page 369 of Exhibit C, item 16-*a* and item 16-*b*, trench requiring sheeting, 340,096 linear feet, trench in hard ground, containing sale, 316,600 linear feet; did not use those figures in making up item "extra expense of shoring, pumping and blasting" on page 1 of Exhibit 60; witness was guided by the statements as to the character of soils to be encountered as it appears in Exhibit C, but used his own figure of 15 per cent, which is less than the amount stated in Exhibit C.

Figures in witness' Raton contract are as follows:

On 4-inch cast iron pipe, $0.62 per linear foot.
On 6-inch cast iron pipe, 0.88 per linear foot.
On 12-inch cast iron pipe, 2.00 per linear foot.

These prices cover the whole work, including the furnishing of the pipe.

Prices of material at Raton are as follows:

4-inch pipe	$31.25 per ton
6-inch pipe	30.25 per ton
12-inch pipe	30.00 per ton

Has not the figures on 24-inch pipe.

Thinks price on specials f. o. b. Raton was $60 per ton, and was paid in addition to that the same price that would be paid for straight pipe of like size. Have laid eleven miles of pipe in Raton to date; the Raton work is not completed; does not know whether it has shown any profit to date. On four-inch pipe Raton price is 62 cents per linear foot, as compared with 46.97 cents per linear foot on the Denver job, or a percentage of 75.7 per cent. On 6-inch pipe, the Raton price is 88 cents per linear foot, the Denver price 67.16 cents, or 72.6 per cent. On 12-inch pipe the Raton price is $2, Denver price $1.527, or 76.3 per cent. On 24-inch pipe the Raton price is $5.60 per linear foot, Denver price $4.1908; the Denver price is about

75 per cent of the Raton price. Applying Raton prices to Denver job, would increase the bid to $4,441,000.

The Raton prices are the estimates for the entire job, made by witness' firm, and includes the profit. On the Denver job the unit price also includes everything; in Exhibit 60, page 2, under "cost of lead and jute, per foot," there is estimated 2.62 cents for 10-inch pipe; in view of the estimate on 8-inch pipe and 12-inch pipe, there would appear to be an error in typewriting. The Mr. Chilberg referred to is the general sales manager of the Colorado Fuel
924 & Iron Company. In the conversation referred to with Mr. Chilberg, witness stated he would use $30 as a fair estimate for the cost of pipe, and Mr. Chilberg told him it was too low; Chilberg was just giving witness advice as a friend of his father's; the conversation with Chilberg was in substance as quoted to witness by counsel in previous cross-examination.

Only has one trenching machine, which has done as much as 75 miles of trenching; the other two are equally as good; leased one machine at one time, but it was not in good condition, and the rental was high, and witness turned it back; the rent on that machine was $20 a day; did not have to make many repairs in addition to the rental.

One of the other machines is seven or eight years old; just used for water works trenches, and is idle a good part of the time. This machine has paid for itself and been charged off; the larger machine for sewer work was second hand when purchased about four years ago; paid $3,400 for it, and it has trenched six miles; has been idle most of the time; doesn't think it is proper to charge off the entire cost of the trenching machines to one Denver job; it would be used in future jobs and included in future estimates; has not added any interest accruing on machines now owned by him in his Denver estimates; thinks the 200 gallon a minute pump would be adequate; thinks the hydrant running wide open would supply about 200 gallons a minute; city would gets its water on its presents ditch rights; witness would do the pumping; does not include anything for cost of the water; private company would have to supply the water; it would not make any difference with the bid whether it was made for the city or private corporation.

Redirect examination by Mr. Stevens:

Raton contract is a sub-contract for a lump sum, around $100,000; involves considerable trenching and pipe work; the original estimate was surely worked out on unit prices, and then made a lump sum; on the main contract with the city of Raton there was a lump price; no unit price used. J. R. Gordon obtained the contract without making any estimates, and witness obtained the sub-contract on basis of estimates; receiving pay for Raton work in water bonds bearing five per cent interest; cannot say that made any difference in estimate; Raton job is very unsatisfactory owing to local conditions, and is assuming a risk there with the present existing water plant and the bond market. It is a family affair; took the bonds at par in place of so much cash; counted on more

profit in Raton than in Denver. With regard to the extra expense of shoring, pumping and blasting, Exhibit C contains prac-
925 tically the same item, but it is a larger estimate. Witness has made his own estimate on that; in estimating the specials at $50 a ton, have added to that the price for laying it; that is a separate item, which appears on page 2 of Exhibit 60, under "Extra lead and specials, 3 per cent of pipe cost." Did not obtain quotations from Mr. Chilberg at the time of conversation with him.

Discussed with Mr. Chilberg the Birmingham quotation of $28.75 a ton; told him witness would use $30 a ton and Chilberg did not agree ; thinks there is no great hazard in this work, because the trenches are shallow, five to six feet deep. In a sewer system the excavation would be very deep, costly and treacherous. Exhibit C does not give very definite information bearing on the question of hazard. In estimating on contracts, does not make any difference whether the specifications are specific or general; the work would be done in workmanlike manner.

Got no illumination from the data set forth in Exhibit C; on each job witness charges a proportionate amount of interest for investment in machinery, tools, etc.; that interest is a small item; has neglected it in a great many cases.

Recross-examination by Mr. Dorsey:

Witness' statement that the hazard in this job would be very small is based upon the experience in other work which he has detailed, and has made a very small allowance on account of any hazard; does not think that an item for profit should be added on top of the Raton estimates, but is not positive; the greater part of the Raton contract is complete. The Raton contract is a family affair, bu thinks it represents a fair contract; it is not a competive job; witness thinks he will do it at the same figure as father estimated; cannot say whether it is a fair contract to the city of Raton; witness paid his father $2,400 for the sub-contract.

FREMONT HILL, a witness for the defendants.

Direct examination by Mr. Stevens:

Have been a contracting engineer for 33 years; built the South Dakota Central Railroad, 100 miles long; water power plant in Michigan, complete, for $200,000; sewer system and water system for Wilmette, Illinois, agregating $400,000; put in a water-works system at Maywood, Illinois, about $125,000; put in a number of sewers and paved a few streets; did all the improving in Auburn, a suburb of Chicago, aggregating possibly a cost of $75,000;
926 put in paving, water system, sewer system, water pipes and eleven miles of sidewalk, 3 miles of outlet sewer at West Pullman, and has done all kinds of little work. Has resided in Denver two years; has been over the distribution system of The Denver Union Water Company for the purpose of trying to fix a reproduction value; examined specifically the river crossings of the distribution system; took the quantities of pipe, valves, hydrants,

specials and similar items from exhibit C, and based an estimate of quantity and material thereon, and estimates the cost of the reproduction of the distribution system of The Denver Union Water Company, similar in construction to the existing plant, at $3,495,742, and stands ready to take a contract therefor. The general details of this estimate are set forth in exhibit 63; eliminated from consideration the service taps; figured that pipes under street car tracks would be laid on the side of the street; took the length of pipe shown in exhibit C, and figured it would be laid in the ordinary way; used a labor cost of $2.50 a day for common labor, on a 8-hour day, most labor in Denver is higher than that; had a proposition from Hendrie & Bolthoff covering all the materials in the bid; covered everything that could properly be charged against that kind of a job, and figured on it as a contractor.

The total of the bid should be $3,395,742.06. Witness also calls attention to corrections which are made on the exhibit.

Cross-exaination by Mr. Dorsey:

Started to learn engineering in 1881; learned it gradually and practiced it all the time; has lived in Denver two years, and has done no contracting here. After leaving the Cincinnati high school ,worked on the Cincinnati Northern, at Lebanon, Ohio; got $30 a month as an axeman, and was finally promoted to $75 a month running levels and transits; was then made resident engineer of the New Orleans and Northeastern, having charge of the construction of a bridge through the swamp; worked on the Tampico division of the Mexican Central as a levelman; ran a transit on the Florida Transit and Peninsula Railroad; came to Colorado and worked between Cash Creek and Aspen with a freighting outfit; was later made inspector of surveys on the Southwestern District of the United States, with headquarters in the field; then bought a sawmill between Montrose and Telluride; went back to Cincinnati, and was made locating engineer on the Chesapeake and Ohio; was made a division engineer of 20 miles between Kinnikinick and Portsmouth; located about 50 miles; located from Gallipolis to Portsmouth, Ohio; locating engineer picks out the most feasible routes; a detailed survey is made by later parties of engineers; was track engineer on
927 the Atchison Topeka & Santa Fe from Chicago south through Illinois, about 250 miles; worked for Miller, Loomis & Gill, contractors on the Rock Island railroad as an arbitrator; returned to Chicago and was appointed division engineer in charge of streets for what is known as the down-town districts; was in charge of new paving; opened his own office in about 1892 for engineering and contracting; from 1891 to 1898 designed the sewer and water system for Wilmette, and constructed it on a percentage; was really in charge of the engineering and construction features, and supervised the carrying out of the contract; that sewer cost the town $250,000, and the water pipes cost about $125,000; there were about 5,000 people in Wilmette; there were no paved streets in that town; there were no underground pipes or street railroads. Work at Maywood, Illinois, aggregated $125,000—all water pipes, pumps, etc.; no ob-

structions to the streets or pavements in Maywood; the pipes crossed under the Northwestern road at a number of places; that involved a total cost of $125,000, including sources of supply, and so on; does not remember how much pipe was laid in the street; it was an outlet sewer, and a sewer system embracing the north part of town. Did work at West Auburn which was an addition to Chicago; put in sewers, water pipes, street paving, sidewalks, curbing, and set up a row of trees; laid out a new addition; did the construction on this work; does not remember the totals on this job; there were no improvements of any kind in the way; the work at West Pullman was similar in character to that at West Auburn; put in a sewer system as Crossdale, Illinois, small town of twelve or fifteen hundred people; no obstructions or pavements there; did a great many other small jobs between 1891 and 1898, but has recited the principal ones; was one year in the United States Army as captain of engineers, during the Spanish War; during that time built water plant at Montauk Point and one at Huntsville, Alabama, for camp service; these were laid in a trench and covered, but not a deep trench; after leaving the army, did some railroad work for Cincinnati, Louisville & Chicago Railroad; then was locator on the Copper Range Railroad in Michigan; afterwards resigned and built a hydro-electric plant at Constantine, Michigan, on the St. Joe river, which cost about $200,000; there was no trenching or pipe laying involved in that; the details of the electric designing were done by The General Electric Company; witness is not an electrical engineer. Witness organized South Dakota Central railroad in about 1905; located it and put in his outfit; some other fellows put in the money, and bonds were issued and sold; had three engines—two freights and a pas-
928 senger. The bondholders afterwards bought the stock; the road is now owned by Mr. Erb; was interested in the Yankton Southern Railroad, which is not built yet; the Yankton Southern road is 1002 miles long; runs from Yankton to Galveston, Texas. Sold the bonds to a French banker on a firm commitment, waiting for the war to end; located a road about 100 miles long from Arkansas City through Wellington to Hutchinson, Kansas. In 1910 went to Cincinnati, and made a plan for union depot and terminal system there; made the plan for myself; did not carry it through.

Witness' activities relate principally to railroad construction. Witness' experience between 1891 and 1898 referred to sewers and water-works, but a relatively small proportion was with reference to laying pipe; is not now interested in a project to bring water from the Fraser river, on the Western Slope, over to this side, for the domestic supply of Denver, but has been interested in that since he was in Denver, and submitted it to the Public Utilities Commission; his proposition was not acted upon; was employed to make the present estimate of the distribution system of The Denver Union Water Company by Mr. J. B. Hunter, Commissioner of Public Improvements.

Did not cooperate or consult with Hiram Phillips in making the estimate; took ten or fifteen days all together; had no engineering assistance; at one time maintained an office in the First National Bank Building, but discontinued that two or three months ago;

has not bid on any of the city work; tried to get to build the water-works for the Utilities Board last summer; that proposition would have included the whole water-works, furnishing the water supply and the piping and the reservoirs, and everything necessary for a proper system; has not progressed far with that proposition; a large item in the distribution system is the cast-iron pipe; took the lengths of pipe, as specified in exhibit C, but did not take the weights; took the standard weights of the pipe manufacturers for class B pipe; did not allow 1½ to 2 per cent excess in listed weights; the total tonnage of cast-iron pipe listed by witness is 60,286, estimated at $30 a ton f. o. b. Denver; have such quotations from Hendrie & Bolthoff; did not tell Hendrie & Bolthoff that he wished 60,286 tons of the various sizes indicated; gave them the mileage of the pipe; had the conference mentioned with Mr. Heckendorf, general manager; did not state how soon pipe would have to be delivered or over what period the delivery would extend; did not look into the quotations on castiron pipe for the period of ten years last past; prices on such pipe fluctuate; has made no effort to ascertain average price for any period of time preceeding the estimate; did not make any in-
929 vestigation to determine the average price f. o. b. Denver paid by the water company for castiron pipe.

(Witness was asked whether he was aware that the water company paid in excess of $30 per ton, on an average, and on objection the question was ruled out.) Past history is not considered in estimate of future costs; has not had any experience in valuing property for rating purposes.

Does not know what the practice of other engineers of public utilities commissions may be with respect to the matter; has based estimate for specials on price of $50 per ton f. o. b. Denver; got that quotation from Hendrie & Bolthoff; specials consisted of crosses, tees, elbows, etc., and are of castiron material; the price varies from time to time.

Running back over 25 years, there has been a variation of 100 per cent in price of specials; in 1905 bid on a water-works system for Sioux City and used $38 per ton; also has known pipe to sell in Chicago at $19.65 per ton.

Did not investigate the average price of specials for any period of years last past, or as to what the water company had actually paid on the average for the same; figured on 1387 tons of specials; intended to take the quantities in Exhibit C. Witness is then referred to correction in class S, item 2, page 110-b, whereon there is a correction for page 365, making a total of 1522 tons, and says a correction should be made on account of that difference.

Exhibit 64 marked and introduced in evidence by defendants.

The pencil figures on the first sheet of exhibit 64 are no part of the letter, but the pencil figures on the second sheet are a part of the letter. One letter is dated January 27, 1914, the other October 5, 1914, and they were delivered to witness respectively on those dates; the two letters mentioned constitute exhibit 64.

The fourth sheet of exhibit 64 belongs to the first letter. The letter of January 27, 1914, was received from Hendrie & Bolthoff when witness was making his own confidential bid to the Public

Utilities Commission, and at the time of the second letter witness asked if the previous quotations would stand, and was told that they would, but was given a quotation on Gaskill hydrants; witness did not accept the quotations; thinks that it would be the custom of Hendrie & Bolthoff, notwithstanding notations on their letterheads, to let quotations stand until notice is given to the contrary. Witness is satisfied that he can go down to Hendrie & Bolthoff and close a contract for all materials on the quotations; if the market went way above the quotations, they would not do it. The quotation is
930 not a contract; either party may ignore it. Made some figures in January, 1914, to be submitted to the Public Utilities Commission, covering an entire water plant, but not an exact duplicate; the prices used are the same on pipe and lead and all material like that; did not make a written statement to the Utilities Commission, but made a confidential personal statement, with the understanding that it should not be repeated by any member of the board; used the same unit prices that he has used in the present estimate; used a larger percentage of profit; does not remember percentage. Witness was asked if, on his proposition to the Utilities Commission, he figured on a profit as large as 15 per cent, to which counsel objected; objection was overruled. Witness cannot state what the percentage of profit was. He proposed a lump sum to construct the whole work and take the bonds; made up an estimate for the purpose of making that proposition, but does not remember the percentage of profit; says it was a larger percentage; did not make an estimate for unforeseen contingencies; did not go into detail on points of delivery of the pipe, but thinks they would be shipped by the railroads and delivered to all the different side-tracks around the city.

Each railroad has its own yardage side-tracks and places of delivery; has not added anything to estimate for switching charges; thinks Hendie & Bolthoff estimate means any place in Denver where it may be delivered; has never done any carload freight business in Denver; after unloading material from the cars it must be conveyed in some way to the trench. Figured a haul of a mile and a half at a cost of $1 a ton; took a map of the city of Denver which had circles on it, showing the different distances from the union depot; saw that there were side-tracks all around at different places, and figured on an average haul of a mile and a half.

Would use teams for haulage; delivery from the mills to Denver in the railroad cars in such quantities and so steadily that it could be hauled directly from the car to the trench without delays and interruptions would be an ideal condition; does not think that can be entirely accomplished, but can be approximated.

Would not provide a storage yard; would haul the material as fast as it arrived and lay it in the streets; would provide in the contract for the privilege of stringing pipe in the streets; has seen possibly five or six miles of it strung in Chicago, and it was permited to remain there until the contractor could get in. Whether five or six miles of pipe strung out in advance of construction be a sufficient margin would depend on how fast the work progressed; cannot ex-

pect a steady stream of delivery; would sub-contract it to a
931 teamster to deliver at a fixed price of 55 or 60 cents per ton;
has not calculated the amount of pipe that would be necessary to assure constant and uninterrupted progress; assumed two years time for the completion of the work, or a progress of 212 miles a year; would not have to have on a hand a quantity in excess of five or six miles of pipe in order to ensure the estimated progress of the work; that would depend on how much material was in the yard and how many teams; there might be 50 teams delivering one day, and then they would be shut off for a day or two.

Would be delivering from the cars; would unload the pipe as it arrived and distribute it; might have more than five or six miles of pipe strung along the streets. If witness made a contract with the city, it would have to permit the use of the streets as a storage yard for the pipes; would use a derrick to load the wagons; figures on six derricks—two men with a derrick; the driver would not touch the pipes; he drives the wagon; would unload the pipe by pulling it off the back of the wagon; would have an unloading apparatus for the big pipe; would employ two to six men for unloading; does not make any separate allowance for loading the wagons; did not calculate so finely as to estimate the ton miles for the haul; in railroad experience has figured ton miles, but not on this job; did not make any specific allowance for unloading the wagons; bases his estimates for haulage on work going on around Denver; coal is delivered at 60 cents a ton up to Colorado Boulevard, and the hauler loads and unloads his wagon; it is much harder to unload coal; thinks the coal hauled around town would be about the same as the average pipe haul; thinks the greatest amount of coal is delivered to residences; proposed to handle all the trenching by machine; has never used trenching machines; has used a steam shovel; thinks it would be possible to use a trenching machine in the streets of Denver; they have been used 15 or 20 years in New York and other big cities and in the congested districts.

The catalogues of the machines show all kind of that stuff. Witness gets his information about trenching machines from the catalogues; all the information is right there.

Figures on 3.8 cents per cubic yard for excavation, using either a Parsons or Austin machine; took the figures in the catalogue for what the machines will do, and added the price of coal, water, etc. Figured on $4.50 a day for an engineer, $2.50 a day for a fireman, $4.50 for coal, $1 for repairs, and $1 for water and oil, making a total of $13.50; figured on 360 yards in 8 hours; for example, 22-inch trench, 6 inches deep, would run half a yard to the foot, and the estimated yardage would be 720 linear feet; the greatest length of
trench would be 22 inches wide; that would be the size for all
932 pipes up to 15 inches; figured an average depth of 6 feet;
trenching machines would cost $5,500 delivered in Denver, for size O Austin machines, or size K Parsons machine; machine would move itself from the railroad to the trench; might not finish in two years; that would depend on circumstances.

Forty-seven per cent of the present system was completed in one

year by the old company; it so states in some of the testimony. Would advise a client that the distribution system could be economically and properly completed in the space of two years. Forty-one per cent of the present system was laid in 1890; it may be that that is the amount that was laid from 1871 to 1890. A construction of such a plant could not be done at less cost if the work covered a period of four years; it could be done as cheaply in two years; would be very glad to get the job to complete it in two years. Lots of times there would be interruptions, but did not think about that at all. The proposition submitted to the Utilities Commission involved the construction of a tunnel, that would take about four years; considers that all tools would depreciate 75 per cent, and that depreciation is figured into the costs per cubic yard.

There would be 440 working days, over which the 75 per cent depreciation would be distributed; does not know how much that would be per day. The contractor is supposed to have interest on his equipment, but did not figure it that close. Allows a dollar a day for repairs, and that is ample. The machinemen guarantee that the machine will last a certain length of time. They guarantee that nothing will break; that guarantee does not cover ordinary repairs; the item of three hundred and some odd thousand dollars on the last sheet, designated "ten per cent profit" will take care of interest on the investment; all of this item is not profit.

Would have a gang of men go along with the trenching machine; the machine completes the trench where there are no obstructions; the pipe-laying gang digs the bell holes; the trench does not have to be cleaned out if the machine is working right; it says so in the catalogue; never had any experience with one. The gang of men looks after the caving; did not make test pits to determine the character of the soil through which the machine would progress; has never done any excavating in Denver; would encounter obstructions about every 25 feet, and these would be multiplied when the center of the city is reached.

Cannot tell what the average size of the gang of men would be; if there were no obstructions the machine would get part of the work of a wagon that was hauling water, and of the sheeting gang, and a gang to clean out the caves; that is provided for in the estimate of cost in the item four and one-half tools, 3.8 for actual excavation, 3 for the digging, 3.7 added, which totals 25 per cent, for overcoming the difficulties of obstructions, digging out pipes, and things that would be met, etc. Witness' estimate is a lump sum at which he would take the job; did not have working plans, maps, cross-sections or other engineering data, according to which the distribution system was originally built; did not go to the water company office for the purpose of examining any such plans; simply had Exhibit C, showing the quantities of pipe that had to be put in; nobody could have information concerning the obstructions that would be encountered or the character of soil to work through or the depth of the trench necessary to avoid obstructions, or the wet work that would be encountered; witness did not have such information.

933

The allowance for sheeting, pumping, bailing, etc., outside of the cost of excavation and backfilling, was estimated at 2.7 per cubic yard over the whole job; made a liberal allowance for it, and did not estimate what part was for sheeting and what for pumping, etc.; knows it is liberal from general experience; there are many things that a man who has followed the business for 30 years knows instinctively. Every kind of construction that witness has undertaken has a bearing on the subject.

Witness' judgment would not be influenced by the fact that Mr. Gaffy allowed $116,000 for the same items that are covered by witness' allowance of $29,600. The fact that Mr. Gaffy's allowance is 18.46 cents per lineal foot, as against witness' allowance of 6½ cents per lineal foot, would not affect his judgment. Would backfill the trenches with a machine throughout all the city; would use a dragline scraper, operated by an engine and moving all by its own power; the cost of backfilling by that method is 3 cents per cubic yard. Would pay an engineer for the machine $3.50, the scraper handler, $3; $3 for coal and $1 for water and oil; it would make the same yardage per day as the trenching machine.

Might have to have a little hand labor in connection with backfilling; would have to tamp and wet; has not been able to get the cost of tamping and wetting; the item of profit would cover that; don't know how much would have to be deducted from profit on that account; it might amount to a cent or a cent and a half a yard; would depend upon what the water company would charge for water; does not know what the water company usually charges; it would be two cents for water alone; would not have to tamp if water was used.

Does not know what the city requires in this respect, but thinks flooding would be better than tamping; cannot know about all these things; they have to be set forth in the contract. Knows
934 what the city's requirements with regard to trenching are; it is usual to require trenches to stand for a time after they have been backfilled before the surface is relaid; never knew that planking would have to be placed over the top of the trench at the expense of the contractor; does not know that there is such a requirement in Denver; has included nothing on account of that item.

Figures $95 per ton for lead; figures on cutting pavement 36 inches wide, or a foot wider than the trench; figured on $2 for removing and replacing; the materials that would be taken out would pay for the cost of taking them out; in replacing them the same stone would be used over again.

The material would have to be broken up to take it out, and has to be broken more in order to make concrete, and it costs to do it. Some of the asphalt could be melted up and used again, but it would have to be carried back to the yard and treated. The cost in Denver for laying new asphalt pavement is $2 a yard; would save all the material in digging out the pavement; thinks he could get the repairing done as cheaply as the price for laying pavement per yard; would do the repairing himself; has had charge of more paving than there is in Denver. Did not see the contractor's books in Chicago.

The item in Exhibit 63, designated "10 per cent profit $308,-

703.82", does not really represent profit. That covers some costs of construction, such as part of the backfilling and like things; would not know what was profit until the job was finished; has made no separate allowance for contractor's overhead or interest during construction. The contractor's bond for faithful performance can be secured for one-half of one per cent; could not tell whether the bond would be for $50,000 or $500,000; no separate allowance for contingencies or administration expense, or office expense, or contractor's bond, or liability insurance or damage claims. All those items with the addition of interest on contractor's capital invested, are included in the 10 per cent. On the contractor's bond could either pay half of one per cent or pay on the liability two and one-half a thousand—about half that much, does not know what kind of a bond would be required; it would depend upon the attorney of the party letting the job; it would be one-half of one per cent of the total cost of the entire work. A bond for the total cost of the work would be an absurd bond, and it would figure one-half of one per cent on that, or $16,500; don't know what the premium on a liability policy would be; would take out a liability bond and public liability bond; suppose they would both cost around eight or ten thousand dollars; has not inquired; does not know that the
935 premium on an employer's liability bond is 4½ per cent of the labor cost; don't know what that would amount to; it would take a good deal of figuring; can't give an approximate estimate; a sub-contractor for the hauling would protect his own men; knows there are limited liability policies; never has had any experience with such insurance.

The contingency of judgments in excess of the insurance company's liability is taken care of out of the profits; has not figured it; would not expect to be subject to accidents; is not a dangerous job; encountering of unexpected obstructions and character of soil would be called contingencies; they would be taken care of out of the ten per cent allowance, which is ten per cent on the entire contract, and seventy-five per cent on the contract price would be for material, and the ten per cent profit on the whole job would be nearly fifty per cent on the labor items; the contingency would come out of the item for profit.

Witness' attention is called to the fact that Mr. Gaffy allows $116,000 for obstructions, and witness allows $25,000, a difference of $90,000; and assuming Mr. Gaffy's figures to be right, the difference of $90,000 would have to come out of the witness' item of profit.

Contractor would have to have an office, bookkeeper, timekeeper, auditor; would not need a purchasing agent or a superintendent. Each foreman on the job would make a daily report as to the pipe laid, trench dug, classes of pipe laid, coal used, and each night the contractor would know where he stood; would have six foremen for his six gangs; would have the trenching machine gang in front, pipe-laying gang just behind it, and backfilling gang immediately behind that; the three parts would constitute one gang.

Would expect that procession to march up and down the streets constantly and continuously, proceeding without interruption and when the parade got by the pipe would be laid and backfilled, and

the pavement put on top of it. Whatever office expense and administration expense would amount to would come out of the 10 per cent profit; figures this job would take two years, working two hundred and twenty-days in each year; would be paid in monthly estimates each thirty days to pay for the working material of the previous thirty days; the contractor would want to be paid for material delivered, although not in place; he can't always get it. If witness was doing the job he would stick out for payment for material delivered; that is the assumption on which the estimate is made; by delivery means delivery on the trench; it is customary for the company to retain 15 per cent, but does not know whether the law requires
936 this or not; it would not be unusual to have 15 per cent on the total work retained for at least thirty-five days after final completion and acceptance of the work; would be paid one-half of the entire contract, less 15 per cent on that one-half at the end of the first year, and the same amount the second year; final settlement might be 30 or 60 days after the work was completed.

Water works usually go through a considerable process of testing before they are turned over; if the pressure could be put on the pipes all at once it is a short job; it is necessary to start with a working capital and maintain it; thinks $25,000 cash would be ample working capital; monthly payroll would be in the neighborhood of $10,000; figures an excavator $13.50 a day; back filler, $10.50; $25.50 for the laying gang—gives $49.50 a day; he calls it $50, multiplies it by 30 days instead of 22; that would be $1,500, and figures on six gangs, or a total of $9,000. Thinks $10,000 would take care of the whole thing. $10,000 does not take into account the hauling. Dividing the $752,000, the total labor cost, by 20 months, the time involved, would be about $37,000 per month for labor; has to pay for large quantities of material. The material man is glad to sell materials, and takes money as the purchaser gets his money; don't think the quotations are for cash; quotations are usually on 30 days' time; would not want to say whether the contractor would have to have $50,000 or $75,000 in capital, besides the 15 per cent which the company would hold out of the estimate; has not gone into that question, but does not think it would take that much; did not go into that question in making up the estimate; would have to furnish considerable equipment at a cost of $55,000. There would be 6 trenching machines, aggregating $33,000; six backfilling machines aggregating $15,000; six sets of tools and lead pots, $1,500; six unloading derricks, $6,000; six trench derricks, $1,500; boxes, lamps and such stuff, $1,000; tools for six gangs, $1500; that makes up witness' $55,000 estimate; would be out the interest on that altogether; that is taken care of in the cost of excavation. Witness figured a 75 per cent depreciation on his equipment and charged that in as part of the cost; that is a depreciation charge, but the interest on the investment would be taken care of by the 10 per cent item of profit; figured on taking out of the profit the cost of the water to back-fill the trench; that would be a considerable cost, but thinks it can be gotten cheaper on a wholesale rate. A charge of one cent per linear foot of trench would be equivalent to one cent for fifteen gallons of water to wash the trench

down; that would be an absurd charge; that water would all be used in settlement; it would leach through the material in the
937 trench before it reached the side; two cubic feet of water to every foot of trench would be adequate; has seen lots of that kind of work done; had one experience in Chicago; public utilities in that city had dug up tracks and not properly back-filled them; went through all the entire subject and made a special report to Mr. McGann, superintendent of construction.

In Chicago the soil is clay, principally; in Denver it is mostly gravel and stuff that would settle readily with water. Sandy soil would not require near as much water as clay; made no estimate whatever for the water; if it is gotten, it is gotten from the water company; if there was no water company in Denver that would be a different proposition, but there is one; is figuring on reproducing a plant in Denver, with the old company present; that is the only way that it could be reproduced; thinks that the pipes should be properly laid on certain sides of the street, adopting, for example, the north and west sides of the street. If witness were undertaking to reproduce the plant of the water company, just as it is to-day, would have to lay miles of pipe underneath street railroad tracks, and parallel therewith, but did not consider that at all; figured on placing the pipes at one side of the railroad tracks. No one would be foolish enough to put a water pipe under a street car track, when there was an open place to put it in; did not figure on reproducting the pipes in their present location. Whatever cost was involved in tamping and flooding the trench, and planking it after it had been back-filled, before repaving or resurfacing, was to be covered by the ten per cent profit item. Nobody would know how much profit would be left until they got through.

Witness is in the habit of figuring on contracts in that way. In figuring the proposed system for the public utilities commission, witness figured his own way; don't remember anything about the percentages on that estimate.

Redirect examination by Mr. Stevens:

In arriving at conclusions, witness relied considerably upon experience he has had with handling men, money and material in general contract work. If Mr. Gaffy is right in his estimate of $116,000 for sheeting and pumping in the trenches, that is fully covered by witness' item of ten per cent for profit. If this item of $116,000, testified to by Mr. Gaffy, was intended to cover sheeting and pumping, instead of obstructions, it would be taken care of in the profit item. The payment for material is determined by the contract, but most any material man is willing to sell material and allow you to pay for it out of each estimate paid by the build-
938 ing party. Bills would be discounted considerably for cash; 30 days is considered as good as cash.

At Maywood, Illinois, it took about a week to make the final tests. At Wilmette, it was done in a different way, and it took about a month; thinks the Denver job should be separated off into units and tested with a separate pump; ought to be done as the work progressed; has figured the difference in price for specials, due to the correction

in Exhibit C, and the difference of 135 tons makes a total difference of $6,750, to be added to the total of the estimate. Adding the profit, this correction would make the total $3,403,167.06. Witness then adds $5 a ton for hauling and setting them, and gives a final total of $3,403,909.56.

From experience in Chicago, on various inspections, and work with which witness became acquainted, he became familiar with obstructions and their effect on work similar to this; took those matters into consideration in making this estimate. The heaviest tonnage in the present estimate would be laid in the heart of the city.

Witness is asked what has been his experience with regard to the actual price on materials when one is ready to close a contract with a supply house. (Objected to. Objection overruled.) As a rule, the actual price is considerably lower than the quoted price.

Recross-examination by Mr. Dorsey:

Has heard indirectly that the prices have dropped some in the last few days; has had no further conference with Hendrie & Bolthoff. Witness' statement as to discount is a statement of what is ordinarily the practice. Hendrie & Bolthoff are not the only pipe men in the world.

FREMONT HILL, called as a witness for the defendant, recalled.

Direct examination by Mr. Stevens:

Has made a computation to arrive at the depreciated value of the estimates offered by various parties in the case; has undertaken to figure the depreciated value upon all estimates submitted, including those by The Denver Union Water Company, by Gaffy & Keef, Mr. Bickel, himself and Mr. Gordon. Exhibit 68 contains the correct computations; it is marked for identification; has taken the life recommended by the Census Bureau, and the two and one-
939 half per cent interest on the sinking fund; has estimated it upon two plans; each plan figures on the same basis; has used Robinson's tables for both methods where the interest is considered; used Robinson's tables for what is entitled on the table "Annuity Sinking Fund Method." The method entitled "Straight-line Depreciation" does not need any tables; Exhibit 68 correctly sets forth witness' computations.

(Objected to on the ground that the computation is "not evidence which is at all informing in relation to the actual depreciation which has in reality occurred up to the date of valuation on the property involved.")

Witness states he has made computations in exhibit 68 on each method of depreciation, according to the tables which are considered standard.

Objected to because there can be no such thing as standard tables to inform anybody as to what depreciation has actually occurred in an existing piece of property.

"Mr. Stevens: I understood the ruling of the master yesterday was that this was purely a matter of computation, which I think it is, and I desire to offer this as the computation made by this wit-

ness upon the two methods, which of course we desire to submit together to the master in this case, for purposes of argument. I noticed that some of the witnesses who preceded this witness upon the stand estimated the value of the property without depreciation and the value of the property with depreciation. According to Mr. Dorsey's theory, and of course according to the theory of all of us, that can be nothing more nor less than their computation; and these tables certainly might be useful to the master, at least in arriving at the computation of the various items set forth here and as embodying our viewpoint as to the proper depreciation which should be made. I don't know of any other way of getting at it.

Mr. Dorsey: We take the view, if your Honor please, that the matter of the actual depreciation which has really occurred in a piece of physical property up to the date when one makes an effort to value it is not a matter of computation or theory, but a matter of fact. It cannot be ascertained by sitting down in your office with a pencil and a piece of paper and a book of rules and working out sums in arithmetic. Mr. Stevens is right in stating that other witnesses who have preceded Mr. Hill, both for the plaintiff and for the defendants, have deducted accrued depreciation from the total gross reproduction of the physical structures of this plant, but without any exception they have all testified that they did so by reason of forming a judgment upon that subject after actual inspection, carefully made, of each and every part of the plant. Now, if Mr. Stevens is
940 willing to crystalize this question by stating that what he presents here is a mere computation,——

Mr. Stevens (interrupting): I have not gone beyond that.

Mr. Dorsey (continuing): —and does not represent in any degree, nor purport to represent, the judgment of Mr. Hill, or anybody else, about what depreciation has actually occurred in the property which constitutes this plant, that is one thing. If he presents it here as evidence of what has actually occurred in this plant in respect to the real depreciation here, that is another thing. Which is this, Mr. Stevens?

Mr. Stevens: I told you very frankly in the beginning I have not tried to qualify this witness in any other way than as making these computations, that is all.

Mr. Dorsey: Then you state for the record, do you, that this is a mere computation, based upon certain life tables of the kinds of property embraced in this plant, and arrived at merely as a process of arithmetic, first, on the basis of the straight-line method of deducting so much for each year, and, second, on the sinking fund method, the sinking fund being computed on the basis of two and one-half per cent.

Mr. Stevens: Yes sir; that is all.

Mr. Dorsey: Both as interpreted by Mr. Hill on each of these.

Mr. Stevens: Yes.

Mr. Dorsey: Then I renew my objection that this is a mere computation and not evidence.

The Master: I will admit it for what it is offered, as the computation of Mr. Hill on these theories.

Mr. Stevens: That is all I want to offer it for."

Cross-examination by Mr. Dorsey:

It is agreed between counsel that the note at the top left-hand corner of exhibit 68 should be stricken off, and that the stenographer may paste a piece of paper over it.

"Mr. Stevens: Certainly. One reason I had the master make the ruling yesterday that I did, I wanted to know just how much of this he would permit by way of argument, and how much of it we should identify in advance, because, of course, unless there is a lot of liberality about it, we have no right to use miscellaneous reports, or reports of miscellaneous commissions. As I understand it, these are all matters of argument. I desire to have it go off, and the stenographer may paste a piece of paper over it, and strike it off the copies."

Witness was asked what he meant by certain theories being "accepted." Witness has looked into the authorities on the subject, and the authorities have given the two plans as those accepted and used by various commissions.

941 (It was then agreed that the witness' statement that the two plans submitted by him are accepted by certain authorities should be stricken from his direct examination.)

Discussion ensued between counsel as to Mr. Hill's testimony.

"Mr. Stevens: I think, Mr. Dorsey, we will strike all of this out, where we started out with the record; we can arrive at it in a very simple way. I am perfectly willing to grant your motion by having the stenographer read the question which I asked him on offering Exhibit 68. I believe that embodies everything. Read that offer.

(Thereupon the stenographer read the following offer made by Mr. Stevens: "Then, if the court please, to shorten the examination, I will offer Exhibit 68 as though the witness had been asked in relation to the several items set forth in Exhibit 68 and had answered according to the computations contained in that exhibit.")

Mr. Stevens: I am perfectly willing to stipulate that every question relating to Mr. Hill attempting to do anything except to compute this upon the basis about which I asked him in offering the exhibit shall go out of the record.

Mr. Dorsey: That is satisfactory to me, if you include in your statement that there is no element of personal judgment on the part of Mr. Hill as to the actual depreciation which has occurred here involved.

Mr. Stevens: Surely.

The Master: It will be so understood.

Mr. Stevens: Then, in order that the record need not have a lot of other things in it, suppose we agree that from the place where we started there in making the offer may all go out of the record.

Mr. Dorsey: I think you have to leave it all in to make the final result understood, unless you start all over again.

Mr. Stevens: I have no objection.

The life tables referred to by the witness are found in a pamphlet bearing on the title page the following: "Department of Commerce and Labor. Bureau of the Census. E. Dana Durand, Director," and so forth, issued in 1911. The life tables begin on page 28.

Exhibits 57 to 68 offered.

942 FREMONT HILL, a witness for the defendant, recalled.

Cross-examination by Mr. Dorsey:

Referring to Exhibit 68, and the legend "Per Cent of Pipe Laid," in the lower left-hand corner of the exhibit, followed by percentage of pipe laid, beginning in the year 1878, witness determined that percentage from the summary in exhibit C; multiplied that summary by the weights of the pipe to get the tonnage laid, and added it, and got the total tonnage, and calculated what each year's amount was in per cent of the whole, and the percentages set down are those arrived at in that way.

With regard to the headline "Value of Sinking Fund at End of Years of Life Consumed, or Depreciation amount," under the general heading "Annuity Sinking Fund Method," witness took Robinson's tables, which show how much is required to be set aside each year for 100 years, at two and one-half percent, to amount to any given sum; that sum, multiplied by the amount in the preceding column, gives the amount that is to be set aside each year to cover the original amount expended in the life of the property. By the same set of tables would arrive at a calculation as to how much that amount, set aside each year, at two and one-half per cent, compound interest, will amount to in the ten years of life consumed. That gives you the value of the sinking fund at the end of the first ten years; that is item of $30,487, in the first column.

Witness takes Robinson's tables and applies them to the first item in class C, Lake Cheesman Reservoir; it requires .002255 to be deposited at the beginning of each year, at two and one-half per cent interest, to amount to one dollar in ten years.

Table 5 in Robinson's tables gives the amount, and table 2 gives the value of the money at the end of ten years; adopted that rate of interest because the city now receives two and one-half per cent on its sinking fund amounts; that is the rule of the bankers; cannot specify what sinking funds the city has on hand, but got the information direct from the treasurer's office; believes those funds are on deposit for 15 years; it is an annual rate of two and a half per cent, not compound rate; they receive it monthly and draw it out to the credit of some other fund; they do not redeposit it; if they did, it would draw interest again; presumes they use the money; that is the city's business.

The depreciation of the plant is arrived at before a calculation such as this can be made; it is assumed to have been arrived at by absolute examination.

943 (The statement of the witness that he has taken the general consensus of opinion of those who know about those things, as the life of an ordinary water-works property, is stricken out.)

Used two and a half per cent, because he did not consider that anybody could receive or make an arrangement with any bank whereby they were to receive a greater rate than two and a half per cent, compound interest, on such a fund; has had no experience in banking business in Denver, but spent a year among the bankers of Europe on this question, and did not do anything else but calculate financial matters; that experience, in connection with the fact that

the city is only receiving two and a half per cent annual interest, would be a good indication as to what could be gotten; knows that anyone can get a certificate of deposit under the clearing house rules in Denver, which draws three per cent; that on a long time deposit can get four per cent, with all kinds of strings tied to it; it is not obligatory upon the utility to invest its money in the bank; it might invest it in funds of various kinds and try to make six or seven per cent, and sometimes might fall down on it.

In figuring at two and one-half per cent, on a million dollars, the annual deposit would be $2255, and at four per cent would be $777; a slight increase in the rate of interest would make a very marked decrease in the annual amount of depreciation; figured by the straight-line method and by the annuity plan, so as to make a comparison between the two methods, starting with the estimate of Metcalfe & Anderson. The estimate by the various contractors for the city are comparable with Metcalfe & Anderson's figures; took the figures just as they were given to the witness in court as being the correct figures to figure from; did not consider that Metcalfe & Anderson's figures included all the overhead cost to the company, and other similar items, and the estimates of Gaffy & Keefe and Bickel do not.

The figures of witness and Mr. Gordon related to the contractor's bid on the distribution system, without the addition of anything else.

Redirect examination by Mr. Stevens:

Discussion between counsel and the master.

In arriving at sum of $30,487, referred to in cross-examination, the factors are the amount of money expended, the years of life given by the rule applied to that particular character of property, and the years of life consumed. By Robinson's tables, the amount to be deposited each year, to equal a dollar, at two and a half per
944 cent, interest compounded annually, is arrived at; that decimal multiplied by the amount expended, equals the annual payment required; then take table number two in Robinson's tables and find what $2655, which is the annual payment, will amount to at two and a half per cent interest, at the end of the ten-year period, and that is $30,487, and the assumed annual payment will yield $30,487 in hand at the end of the ten year period, to off-set the depreciation in that time.

(It is understood between counsel that when Mr. Gordon gets his Raton figures, and Mr. Allen gets figures on the excavation of the Capitol Hill reservoir, they may be examined as under cross-examination.)

ACHERT BICKEL, a witness on behalf of the defendant.

Direct examination by Mr. Stevens.

General contractor residing in Kansas City, Missouri; water-works, electric lights, manufacturing establishments, and various things of that sort; been in business about eight years; was in engineering business along the same line; chief part of business is as contractor

for water-works systems. The present company has constructed 30 or 35 plants; name of the company is the Commercial Construction Company, with headquarters at Kansas City, Missouri.

Witness has made an estimate of the reproduction cost of the system of The Denver Union Water Company, employed by Mr. J. B. Hunter, commissioner of improvements of the city and county of Denver; report is fully embodied in book marked exhibit 65; has set forth on pages 66, 67 and 67-a the details of his estimate; figured on two assumptions: one as contractor and one as though building a plant for himself; where employed as contractors, furnished plans by the owners, taking no promotion or executive expense; the estimate is $8,576,560.41; the cost to the owner would be $9,915,388.

Figures on reproducing the present plant of The Denver Union Water Company as nearly as possible; took the quantities from Exhibit C; has not used the yardage set forth in exhibit C in excavation and back-fill for pipe lines; has not included the service taps or extra costs of laying mains under tracks or conduits paralleling water mains; has not included lands or water rights. The price on building materials was furnished by Messrs. Willison & Walsh; the wood-stave pipe prices furnished by Gaffy & Keefe; all figures written in red, and followed by a star, are identical with the
945 Water Company estimates; the report, exhibit 65, shows a detailed statement of the values of the several items; has not explanatory notes and tables in shape to furnish; part of them are on paper; part in office in Kansas City and part in the witness' head.

Exhibit 65 admitted in evidence.

Cross-examination by Mr. Dorsey:

From Exhibit 65 one can take any particular item and find the cost of that item as estimated by witness. The prices by which such items are arrived at are not stated. The quantities set forth in exhibit C are not again stated. Witness can give the unit price on any particular quantities; cannot at the present time furnish a statement of all unit prices.

Has been engaged in the general contracting business for approximately eight years; all of that time in Kansas City; prior to that time was employed by The W. K. Palmer Company, engineers; studied electrical engineering at the University of Arkansas; left that institution in 1900; did not graduate; believes he went to Kansas City; don't remember; that was more or less of a nightmare; there are some things that we would like to forget; is not at liberty to tell. The truth is he was hungry and broke; went home to Cleveland, Missouri; did not engage in business there, and did not stay very long; came to Denver in 1901; stayed here about six months; worked for the Tramway Company, holding the ends of wires for an armature winder; then went to Telluride Transmission Company, at Telluride; remained there about a year as operator of their station at Vance; was not in charge of the station; worked as an operator; did not have any work after that for a considerable length of time; was out of a job six months; went back to Kansas City

and worked for The General Electric Company about six months in erecting switch-boards in the power plant of The Kansas City Electric Light Company; then worked for the Metropolitan Street Railway Company; installed rotary converters for the street railway company at so much per day; next job was with the W. K. Palmer Engineering Company; remained there two years as electrical engineer and designing, electric light, water works, sewer construction, railway service; was in the field principally; didn't have anything to do with water works construction for the W. K. Palmer Company; afterwards employed by The Hodge Electric & Manufacturing Company of Kansas City as sales manager, in the office and on the road; installed a combination water, coal and ice-handling apparatus for the Burlington Company in the Kansas City yards; not really a water works system; next job was with the Freeborn Engineering & Construction Company of Kansas City
946 in capacity of contracting manager; remained with them about three years—until about 1910; built cement mills, water works, electric light and sewerage systems, some dams and general construction; during that time built a plant at Hartshorn, Oklahoma.

Witness secured the contract, employed the men, acted in a supervisory capacity; Hartshorn has a population of three or four thousand; that was witness' first water works installation; there were no paved streets, but there were gas pipes; the contract price was $105,000 for dam, pumping plant, cast-iron distribution system, steel tank and tower. The dam was reinforced concrete, to cross the bed of a dry stream; about a mile and a half of cast iron supply pipe, 12-inch size; don't remember the sizes of the pipe in the distribution system; trench was cut with a trenching machine; does not know positively whether there were gas pipes in the street; made the estimate for the Hartshorn job.

Next job was at Osage City, Kansas; made the estimates, prepared bids and secured the contracts; Osage City has a population of about 3500 people; there was a private water plant and a gas plant; no pavements or street car tracks; does not remember the price of the Osage City job; built there a reinforced concrete dam across a dry stream; about a mile and a half of ten-inch supply pipe; does not recollect the mileage of the distribution system, but the pipe was from four inches up to and including ten-inch pipe; built a plant at Augusta, Kansas; made the estimates, prepared the bids, and supervised the construction; Burns & MacDonald designed the plants; witness did not design any of them; population of Augusta about 500 people; put down four wells with a common suction line between the wells to a small pump house, two triplex pumps, which pumped water out of the wells into the distribution system; don't know what is meant by gravity system; there are so many different kinds; the pumps and the tanks afforded the pressure.

Built an extension at Dodge City, Kansas, covering pumping plant and some distribution mains; does not recollect the mileage; don't know the population of Dodge City; there were no paved streets where the pipes were put in; encountered no obstructions; crossed the Santa Fe tracks; no street railway; built a dam for the

city of Wichita; it had nothing to do with water works; witness assisted in the designing of it; the engineers were Burns & MacDonald of Kansas City; the dam was to afford water for boating and pleasure purposes, in a park called Riverside; contract price was $23,000.

947 Built a water works system for the Jackson County home for the aged and infirm, in Jackson County, Missouri, consisted of a lake, earthen dam, small pumping station and a pipe line; about a mile and a half of pipe; contract price was $30,000.

Built a sewer system at Centralia, Missouri; does not remember of any more water works systems.

Mr. Hiram Phillips was not the engineer on any of these projects; has never done any work for Mr. Phillips yet.

As witness recalls it, he has now detailed all the important water works; left the Freeborn people in 1910 and went into business for himself; witness' company is The Commercial Construction Company, with headquarters at Kansas City; build water works, electric light and sewer systems; has designed some; is president of the company.

Witness' company constructed water works for Altoona, Kansas; about a thousand people; constructed an intake well, pumping station, pipe line to the town, and distribution system; pipe line was about a mile and a half; either six or eight-inch pipe; about three and a half miles of distribution system four to six-inch pipe; great many obstructions; gas pipe for natural gas; contract was not to exceed $10,000; city furnished the plans, designs and some of the materials; witness furnished the cast iron pipe, pumps, erected the pumping station, and set up the engines.

Moberly, Missouri, is a city of 15,000; witness rebuilt pumping station, made new connections between reservoirs and pumps; built electric transmission line; installed street lights; did not involve any distribution system; the supply line was a duplicate line; 16-inch cast iron pipe; total contract price for water and electrical work, $40,000.

At Sylvan Grove, Kansas, town of 700 population, built water works and electric light, consisting of a pumping station and distribution system; supply line pipe was eight inches; don't recollect the length; the total contract for water and electric light was $35,000; there were no paved streets or underground conduits.

At Luray, Kansas, built a water works plant, a little pumping station, steel tank in town and distribution system of approximately three miles, of four and six-inch cast iron pipe; total contract price $20,000; no paved streets or underground conduits; built a pumping station for the Kaw Valley Drainage District, for the drainage of flooded lands; that was an 18-inch pump and supplied 10,000 gallons a minute.

At Lyndon, Kansas, population approximately 2,000, built small dam and flow-line, pumping station, distribution system, town
948 tank, filtration plant and settling basin; dam was built of steel piling, filled with concrete; wasn't very much; was a dam across a small stream; flow-line about a mile of ten-inch cast iron

pipe; there were motor-driven centrifugal pumps; don't recall the capacity of the pumps; there was a mechanical filter, and approximately six miles of distribution line of four and six-inch cast iron pipe; total contract price about $40,000; some macadam streets, very few in comparison with the entire system; no underground conduits.

At North Kansas City, Missouri, built pumping plant, filtration plant and distribution system; at the time it was built there was practically nothing there; it was a piece of property owned by the Armour-Swift interests, laid out for a manufacturing settlement; no paved streets or underground conduits; it was about 50 feet from the point of supply to the distribution; the entire area of the town covers 4,000 acres; pipes run from 20-inch to 4-inch cast iron; total contract price $200,000, but this covers small electric lighting system and small sewerage pumping station; water plant would approximate $144,000.

At Monroe City, Missouri, city of approximately 5,000, built reservoir, two pumping stations, filtration plant and distribution system; built an earthen dam, taking care of run-off water; this dam was about 1,500 feet long, 25 or 30 feet at its highest point; flow-line mile long, of 8 or 10-inch cast iron pipe; built a mechanical gravity filler of capacity of half million gallons; 4, 6 and 8-inch cast iron pipes in distribution system; total contract price is approximately $35,000; pipes were purchased by the city; some macadam pavement; met with electric light conduits in the main part of the city, but not a great deal.

At Berryville, Arkansas, a town of 2,500 people, built a pumping station, distribution system, tower and tank; about 15 feet from the point of supply to the city distribution system; about four miles of distribution system; 4, 6 and 8-inch cast iron pipe; 2-inch wrought iron pipe; no pavements, street railroads or underground conduits; total contract price $18,000.

At Bolivar, Missouri, a town of 5,000, remodeled electric light and pumping station, and extended pipe lines and cross-connections; put in new pumping machinery; added 15,000 feet of 4-inch cast iron pipe to the distribution system; total contract price $25,000; don't think there were any paved streets; might have been some underground conduits; no street railways.

Witness has been intimately associated with all the work done by the company at Knoxville, Iowa, town of 5,000 people; two pumping stations, a flow-line and a reservoir; reservoir was reinforced concrete, containing about half-million gallons; motor-driven
949 centrifugal pump, furnishing 700 gallons a minute; one flow-line, six miles long, ten-inch cast iron pipe; total contract price $35,000, exclusive of cast iron pipes, which were furnished by the city; about 1,000 feet of macadam road; no underground obstructions.

At Armour, Kansas, a town close to Pittsburg, Kansas, a city of 1500 people, built water works and electric light, combination plant; deep well, deep well pump, concrete settling basin, motor-driven centrifugal pump, steel tank and tower, pipe line; distribution system; flow-line was 30 to 40 feet; pump capacity 200 gallons per

minute; two miles of distribution system; from 4 to 8-inch cast iron pipe; total contract price $28,000; no paved streets or underground conduits.

At Auxvasse, Missouri, a city of 1,000 people, put in pumping station and distribution system; three miles of 4 and 6-inch pipe; don't remember the contract price; there were no paved streets or underground conduits.

When with the Freeborn Company put in plant at Santa Rosa, New Mexico; population 500; total contract price $25,000; covered flow-line, distribution system and intake; flow line four miles long; 4-inch pipe; two miles of distribution system; 6 and 4-inch pipe of cast iron; no paved streets or street car lines, or underground conduits. Witness cannot think of any more.

At Neosho, Missouri, a city of 6,000 inhabitants, put in intake flow-line, reinforced concrete reservoir, distribution system, and took up and replaced a lot of old wooden pipe with cast iron pipe; total contract price $60,000; source of supply was a spring; concrete reservoir held 500,000 gallons; flow-line, five miles, of 10-inch cast iron pipe; 50,000 feet of distribution system; macadam paving for about 15,000 feet, which had to be trenched; encountered water pipes and house connections; there were no street car lines; were some sewers.

During the Freeborn period, at Nevada, Missouri, remodelled power house and installed new boilers; erected new engine and generator; made some extensions to pipe lines; overhauled air compressors, and did some work upon the gas plant and street railway system; there were about 10,000 feet of distribution pipe; entire contract amounted to $26,500; Nevada, Missouri, has a population of 8,000.

During the Freeborn period that company built a great number of structures that ran from $30,000 to $700,000 in price, and of type and character of construction that entered into the class of construction that is general, such as reinforced concrete, building mills for making cement and handling stuff from quarries.

950 A great many things enter into that class of construction that enter into similar construction.

Has now mentioned all the instances of every type that witness has been connected with in the way of construction. Did some work in Kansas City for private corporation, that involved a pipe line connected to the city water works system; that involved some street work, and laid a fire protection line for The American Radiator Company, and connection was made with the city main, which came from under a paved street; that was about 2,000 feet of 4-inch cast iron pipe; only a part of it was located in the street; about half of it was under paving; paving was concrete base, with creosoted wooden blocks; was located in the manufacturing district, not in the residence or business or congested district; encountered some sewers; total contract price was $2,500.

Put in another small pipe line for Montgomery Ward & Co. of Kansas City, laying about 1,000 feet of six-inch cast iron pipe; total contract price $1,200.

Has now mentioned all the work in which he has been engaged, involving trenching in city streets.

Was engaged two and a half months in getting up present estimate; had assistance, but was not assisted by Mr. Hiram Phillips, except that Mr. Phillips went with the witness in a motor car over property; so far as the estimate or prices or figuring was concerned, Mr. Phillips knows nothing about it; work was done partially in the office in Kansas City and partially here.

Witness' exhibit 65 covers classes C to S, inclusive, bearing corresponding letters in plaintiff's exhibit C; had exhibit C before him in preparing the estimate; did not include lands, rights of way, water rights or stock on hand.

The price of $8,576,560.41, appearing near the top of page 67, is the price at which witness would undertake to reproduce the structures in classes C to S, from plans and specifications furnished, and includes the amount computed on Classes C to S, both inclusive, plus an item of general overhead and contingencies, amounting to $370,000.

On page 67-*a* of exhibit 65 there are additional costs which should be borne by the water company. They are costs that come under the head of promotion and executive expense to owner of plant, and were put in for the reason that if witness were reproducing the plant for himself, not as a contractor, he would have that additional expense.

Witness had excluded service taps and the extra cost of laying mains under conduits or tracks paralleling same. Exhibit C also contains the cost of the dam, which was excluded from wit-
951 ness' estimate; excluded nothing else except what is called for in the letter; included the Ashland Avenue reservoir lining; in getting up exhibit 65 had exhibit C before him, and supplemented that by looking at the property; had the plans and specification for Cheesman Dam, and looked at quite a number of plans and profiles in the Water company's office, together with the plans shown in exhibit C; in the Water Company's office inspected the drawings of the water tanks, profiles of conduits plan of steel stack, and several others, which he does not recollect; went to the office twice. On the first visit to the office, did not have access to them. The second time had several hours there.

The occasion on which witness did not have access to the plans was six weeks ago. Prior to that time, had completed the investigation and the typewriting of a good deal of it, but had not completed final figures.

On the second visit to the company's office, arrived there about 8:30 in the morning and staved until noon. One of witness' men made some copies and visited the office a number of times; did not make copies of all of them; witness did not inspect all of them; inspected quite a few of them; had no plans, cross-sections or specifications, or other data relative to the distribution system, except what was contained in Exhibit C; travelled completely over the town a good many times, looking over the general character of the work

on which expected to make an estimate; spent about seven weeks' time in Denver.

On the first visit to Denver witness stayed at the Brown Palace Hotel; that was about two and a half months ago; was employed by John B. Hunter, city commissioner of improvements; stayed a little over a week on the first visit; two weeks later returned to Denver; stayed at the Erhard Hotel on Broadway; stayed about two weeks that time; came back a week or ten days later; stayed at the same place; remained about two and a half weeks; returned thirty days later, just prior to going on the stand; about six weeks was the total time in Denver devoted to the matter.

Referring to Class S, distribution pipe system, a very large item is material, and the largest part of it is cast iron pipe; there were 60,271 tons, and witness has given the total figure but cannot give the unit price; that figure covers delivery at the trench; saw Mr. Metcalfe's unit prices in Exhibit C; assumed the pipe would cost $29.60 f. o. b. Denver; that was a Birmingham quotation, made October 7th.

If witness could place an order for the pipe, it would be delivered over a period of two years; did not make any investigation of the variations in the price of cast iron pipe during the last ten
952 years. The fluctuation in the price of that article depends upon the location of the delivery point; cannot say whether there has been a wide fluctuation in price of cast iron pipe at the foundry in the last ten years; has never investigated the question; does not know what the fluctuation has been in Denver; used the momentary quotation of October 7, 1914; has bought pipe cheaper since the time of quotation.

(Witness was asked whether he thought it was fair to apply momentary unit price, as a fair measure of the value of a water works system, for the purpose of rating, to which objection was made and sustained.)

The price on cast iron pipe was quoted f. o. b. Denver expected to route pipe over different lines which would give setting facilities; figured on seven or eight different unloading points; expected that the railroads would set them on their own switches; only recollects the Union Pacific and the Colorado & Southern; assumed that the railroad would set the pipe on sidings four or five miles from the usual point of delivery; assumed an average two-mile haul to the trenches; expected to transport by teams or business motors; allowed 25 cents per ton-mile, or 50 cents a ton on the average; that price is made up from witness' cost records of previous transportation of pipe; did not make any assumption as to the number of handlings from car to trench; 50 cents covers all costs from railroad to trench; the number of handlings would vary considerably, due to the conditions under which it was handled; it would possibly be handled directly from the railroad to the trench; did not assume it would be; witness' cost records were on handling in different ways.

The total of the jobs testified to by the witness would, as a whole, make a job of the magnitude of the Denver contract; no comparison between the quantity of cast iron pipe handled on any of those jobs

and the quantity on the Denver job; the largest handled by witness on any one job heretofore is approximately 1200 tons; thinks it would make a considerable difference in the case whether material was unloaded direct from the railroad to the trench or had to be unloaded into a yard, and reloaded from there; does not think it would be necessary to unload in a yard on this job; heretofore witness has been able to get railroad deliveries at a rate exactly in pace with the excavation. There is no job that compares with this one, in the country; thinks railroad, with 60,000 tons in sight, would operate with more efficiency than with 1000 tons. There is no difference based on the capacity of the foundry to turn out a thousand tons or 60,000 tons. The estimate of 50 cents per ton is based on handling direct from railroad to trench; would unload the cars
953 with block and fall derricks; would have eight unloading stations, each one equipped with necessary apparatus; don't know how many men would be required at each station; makes figures from cost figures on other jobs; would have to have men at each place to unload, but the number would vary with the different types of labor. The driver on the wagon would not do the unloading by himself; figures on paying men 20 cents per hour for a 10-hour day, but would pay more, depending upon the efficiency of the men; the maximum for unskilled labor would be $3.50. Unskilled labor is lower; that is not classed with any particular trade.

Pays $3.50 per day to some common laborers handling pipe in the trenches; they are men that are with witness all the time; these men would be detained at the unloading stations all the time; would pay teamsters $5 per day, including wagon and team; would handle heavier pipe by derricks, and lighter pipe would be handled by hand; would have men at the trench to help unload; on the smaller pipe would have two or three men; would figure on having excavation proceed in the usual way, that the pipe could be laid without interruption, and the pipe would be delivered at a rate just sufficient to keep up with the excavating gang, but such conditions seldom occur.

Figures on the average condition, and the unusual condition is taken care of in the contingent fund. Witness thinks the pipe would come with fair regularity along the line indicated, and that would be average condition; if the pipe did not happen to come as fast as wanted, would find work for the men to do; if the pipe came faster than wanted, it could be strung along the streets; don't know how much he would have on hand, but has provided warehouses for taking care of the surplus stuff; expects to find them along the railroad and rent them, and unload from the cars to the warehouses, and then haul from the warehouses by wagons; that cost is covered in the contingent fund.

As to the cast iron pipe, takes the quotation $29.60 f. o. b. Denver, and adds 50 cents per ton for handling, making $30.10; this does not include overhead and profit; recollection is that the overhead and profit covering entire section of Class S is figured at 16 per cent of the cost; can segregate the overhead from the profit, but it will take time; will also have to figure whether he added the profit as a per-

centage to the cost, plus overhead; item of 16 per cent was evenly distributed over each item in Class S, including cast iron pipe, specials and other things. Figured on $55 per ton f. o. b. Denver for specials; assumed that it would be delivered around the city in the same way; assumed $1 per ton for haulage on specials,
954 making $56 at the trench, and to that added overhead and profit of 16 per cent, making the total per ton at the trench; made no investigation to learn what the water company has had to pay on an average for its pipe and specials during any period of time past. Specials fluctuate in cost, like pipe. The quotation on specials was secured on October 7th from Birmingham; obtained by correspondence from different foundries; all obtained about the same time; used those quotations as the basic figures f. o. b. Denver.

On page 6 of Exhibit 65 the figures under the item "Laying cast iron pipe," covered trenching, laying and backfilling, included lead and yarn. Under the column "Quantity," as it relates to item 12, has put down the length of each size of pipe. The aggregate length of that would be the length of the trench; changed the width of the trenches as assumed in Exhibit C; gives width of trench and pipe as follows:

Pipe.	Width.	Depth.
30-inch	4 feet	7 feet 2 inches
24-inch	3 feet	6 feet 8 inches
20-inch	3 feet	6 feet 4 inches
18-inch	3 feet	6 feet 2 inches
16-inch	2 feet 4 inches	6 feet
15-inch	2 feet 4 inches	5 feet 11 inches
14-inch	2 feet 4 inches	5 feet 10 inches
12-inch	2 feet	5 feet 8 inches
10-inch	2 feet	5 feet 6 inches
8-inch	1 foot 6 inches	5 feet 4 inches
6-inch	1 foot 6 inches	5 feet 2 inches
4-inch	1 foot 6 inches	5 feet
3-inch	1 foot 6 inches	4 feet 11 inches

Would do the excavation by machine and hand—approximately 75 per cent by machine and 25 per cent by hand, outside of river and ditch crossings. Those percentages apply to yardage, and not linear feet; would not know how to figure it by linear feet because on meeting obstructions it would be necessary to raise the boom over, and that would necessitate hand work; has not estimated the total cubic yards of excavation for each size of pipe; prices are figured on price per foot of trench work; has figures showing the yardage for each class of pipe, as follows:

Pipe.	Yardage.
30-inch	1.06
24-inch	.74
20-inch	.704

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Pipe.	Yardage.
18-inch	.685
16-inch	.518
15-inch	.51
14-inch	.507
12-inch	.42
10-inch	.393
8-inch	.296
6-inch	.286
4-inch	.278
3-inch	.273

Should like to check the last two; has not the total yardage for each class. The basis price for trench is:

Pipe.	Price.
30-inch	20 cents
24-inch	24 cents
20-inch	13 cents
18-inch	13 cents
16-inch	10 cents
15-inch	10 cents
14-inch	10 cents
12-inch	8 cents
10-inch	7 cents
8-inch	6 cents
6-inch	5 cents
4-inch	5 cents
3-inch	5 cents

That is the basic price for excavation per linear foot. To that is added overhead and profit. Figured the basic price for laying the pipe, including lead and jute, as follows: For 30-inch pipe figured the number of linear feet of excavation, yards of backfill, laying and calking of the pipe, the lead, the jute, and the bell holes, which gave a total figure for that particular size pipe, and that goes into the estimate to make up the total. The totals for each class are as follows:

Pipe.	Price.
30-inch	$4,824.20
24-inch	39,725.37
20-inch	6,876.63
18-inch	8,688.82
16-inch	25,682.62
15-inch	22,022.04
14-inch	11,939.69
12-inch	89,874.31

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Pipe.	Price.
10-inch	19,878.96
8-inch	35,040.71
6-inch	185,875.74
4-inch	33,134.79
3-inch	1,436.42
Sum total is	$465,198.30

That is the basic cost of labor and material without the addition of overhead and profit; to that, added approximately 16 per cent. Witness will figure up and give the basic cost of laying, including lead and yarn, on each class of pipe, giving the lead, yarn and the laying in separate items, and the basic cost per linear foot for the backfill on each class of pipe.

Witness' figures can be reduced to cost per linear foot; used a basic price of 18 cents per cubic yard for excavation; that was an average allowance.

Witness has averaged unit costs over different classes of construction work. In this instance has taken the average cost per yard over the period of time through which he has been operating, for the machine work, and has added to that 30 cents per cubic yard for hand work; has taken the combination as a whole and increased it 25 per cent above average cost, and used that figure as a basis for the entire excavation; took an average cost of 9.2 cents per cubic yard for machine work, and added 25 cents to it; arrived at the 9.2 cents by complete cost records and data on each job that he has done; uses an Austin trenching machine. The Denver job would take a number 001; has forgotten what they cost; would use little ones and big ones; No. 0 machine cost $7200; little one costs $5500, f. o. b. Denver; they arrive ready for operation.

Figures on making an average of 700 feet per day with a machine and the work; two hundred days in each calendar year; would finish the distribution system in two years; could accomplish that footage with each machine.

Witness' cost records included daily operating expense of the machine and the basic price for excavation is based on those cost records; segregates in his records the cost of trenching by machines; includes in those records labor, repairs and fuel; has operated the machines without an engineer and fireman; has a gasoline-driven machine, run by one man. They use an engineer and fireman on a steam machine; witness has used both.

Cost records do not include anything on account of depreciation in the machine; expects to write off machines in five years;
957 on this job assumed to write off machines at twenty per cent per year; that goes into the overhead and profit; that is part of the 16 per cent as a charge for interest during construction, but must look up in detail before he can say that that covers the investment in trenching machines; each particular section in the estimate

is figured as a job by itself, and the whole is combined in one contract, and covered in a general fund.

Interest during construction is embraced in the 16 per cent; figured on using eight machines; has one machine on hand now; has had two; one was bought new; cannot tell how much trenching that one machine has done; would have to buy seven or eight new machines; would have them on hand at the end of the job; it would be some time before another job would be secured that would require that many machines; interest on investment on the machines after this job was ended would have nothing to do with the contract; contractors seldom get back the money which is lost on account of interest in fixed equipment during idleness; overhead costs, office expenses, and the figuring and estimating on jobs which a contractor don't get, must come out of the profit of actual operations over an extended period. In this case figured that in the general over-head and contingent fund of $370,000. Witness corrects that: Says that the general overhead and contingent fund is to furnish a general office for the construction of the property in Denver alone, and confined to this particular job. Does not include in the Denver contract anything to cover expenses of his company between jobs, although he has such an expense; made a general investigation of the materials that would be encountered, the same as he would on any contract; did not sink any test holes; saw quite a number of open excavations in Denver distributed over the entire town; did not know who was making them; saw two or three in the congested district; don't recall how many others; there were places where streets had been cut down, and there were excavations in basements, just showing the general character of the soil; has used trenching machines in the various towns concerning which he has testified; has never used one in any town the size of Denver; has never used one where street car tracks, underground obstructions and pavements are encountered to the extent that they are in Denver; has never done any trenching in Denver or Colorado, but thinks his cost figures afford a reliable foundation for the Denver estimate, because they have operated over a great variation in soil, and because 25 per cent was added to his cost records. The character of the soil is very similar to the character in which witness has
958 operated machines in other places—for example, the western part of Kansas.

It is upon cost data gathered from those excavations that witness makes his estimate; did not expect to operate the trenching machines in the downtown district of Denver; there are 263,000 feet of the work under pavements, which is 11.7 per cent of the total trench. This leaves 33 1-3% of the hand work, after including the creek, river, ditch and railroad crossings, so the pavements are practically eliminated. By pavements, means everything but surfacing. There will be hand labor in restoring the pavement; would have to have very little hand labor where no obstructions are encountered; would not clean the trench after the machine, unless it was caved. The machine does not dig bell holes; they must be dug by hand; does not class the bell holes with the excavation at all.

So far as excavation is concerned, the Denver job is more difficult than any one that witness has undertaken; does not think it would have been fair to take his cost records on the most difficult job he has ever undertaken; started with a basic figure of 30 cents per cubic yard for hand work, and added 25 per cent to make the basic figure, and the 30 cents is higher than witness' average cost record.

A good portion of the hand work will be under obstructions, pipes, conduits and other things, and cost more money on account of it. The machine work would be increased because of moving over obstacles.

Witness' figure of 30 cents per cubic yard for hand work is higher than his averages, and to that he added 25 per cent. His figure of 9.2 per cent for machine excavation is his average on his own cost records, and to that he added 25 per cent; made a mistake in saying that 30 cents was higher than his average cost figures for hand labor, as prices on hand labor vary from 12 cents per cubic yard up; it is the difficult part of the Denver job which would be done by hand labor; thinks he has estimated enough for it.

Item 16, Exhibit 65, page 62, subdivision S, designated "Sheeting," covers that item only. Pumping, bailing and trenching hard ground, shoring, work in shale, and things of that sort, is covered in the excavation cost; the trenching cost will take care of the shale; pumping and bailing will be taken care of in the contingent item on the last page of Exhibit 65; shoring is taken care of in the sheeting; means the same thing.

The allowance for asphalt pavement is $163,146.17; uses the unit price of $2.75 per square yard for taking out and replacing; used a cut for the asphalt approximately the same as the size of the trench; has made a 2-foot cut in the pavement for the 12-
959 inch pipe. The trench for the 12-inch pipe would also be two feet. The asphalt cuts are the same width as the trench; was informed by the Parker-Washington Company of Kansas City that that would be adequate; witness has not had enough experience to figure on it; does not know whether the city would permit the pavement to be cut as narrow as the trench.

The unit price used was supplied by someone in Kansas City; item 19, subdivision C, on page 64, was omitted by instruction from the city; does not intend to exclude railroad crossings, but does intend to exclude superposed or parallel tracks; omitted street railway crossings for the same reason, being instructed so to do by Mr. Hunter; thinks the letter was from Mr. Stevens.

Witness compares Exhibit C, page 388, plates 192 to 207, with his item 20, subdivision I, where he appears to have omitted an estimate.

In item 21, subdivision A, relating to telephone conduits there is an omission.

ACHERT BICKEL resumed the stand for —.

Cross-examination by Mr. Dorsey:

Has separate figures for laying the pipe, the lead and jute and the backfilling.

Size of pipe (inch).	Laying and calking (per linear foot).	Backfilling.	Lead and jute.	Bell holes.
[illegible]	30 cents.	16 cents.	18 cents.	20 cents.
[illegible]	20 "	12 "	14.9 "	15 "
20	14 "	11 "	12.25 "	12 "
18	11 "	10 "	10.17 "	12 "
16	10 "	8 "	9.85 "	12 "
15	9 "	8 "	10.67 "	12 "
14	9 "	8 "	7 "	11 "
12	6 "	6 "	6 "	11 "
10	4½ "	6 "	5 "	11 "
8	3 "	5 "	4 "	11 "
6	2½ "	4 "	3 "	10 "
4	2 "	4 "	2.2 "	10 "
3	1½ "	4 "	1.49 "	10 "

Lead and jute may vary one per cent one way or the other. To these figures witness adds the cost of bell holes, hauling, and
960 storing lead and jute. The figures for bell holes are per bell hole; and assumed that there would be one every 24 feet. There is also added a dollar a ton for hauling and storing jute and lead; the items which enter into witness' unit price per lineal foot for laying the cast iron pipe is shown in item 12 Class S, page 62, of Exhibit 65, as follows: Excavation, bell holes, laying, backfill, lead, jute, hauling and storing lead and jute; item of $1 per pound on lead and jute does not cover the cost of lead and jute, which was $3.45 per hundred pounds on lead and $4.24 on hundred pounds on jute, f. o. b. Denver. After figuring the number of bell holes that would result from dividing the total linear feet of pipe by 12, witness added a factor of ten per cent to the result; figured the backfilling by hand labor, backfilling machines and puddling; in the downtown district would backfill by hand; would get the water for puddling out of hydrants attached to the main which he is laying; would get it by pumping or gravity. The owner of the plant would do the pumping; does not know what the water service would cost; witness' estimate on backfilling is taken from his cost records under similar conditions where dirt was tamped around the pipe and puddled, and for this estimate has increased the basic cost shown by his records. He pays 15 cents per thousand gallons for water; figured the backfilling on this job at fifteen cents per cubic yard; cannot give the average cost of backfilling as shown by witness through cost records; cost of backfilling, trenching and pipe-laying in the congested district would be much greater than in other parts of the city; the care of street traffic, bridging trenches at cross streets, is taken care of in the contingent fund, and would depend entirely on the number of streets that were opened at once. The rate of speed assumed by witness would require a large number of open trenches existing simultaneously, which would make a cost; cannot answer what that cost would be. The cost of taking care of street car tracks is provided for in street car crossings; has not estimated anything for taking

care of parallel street car tracks; if pipes are laid near a street car track, even though they be not under it, the tracks must be taken care of, and that involves an additional expense. The additional expense connected with the excavation is taken care of in the contingent fund. Has provided a general contingency of $370,000, but there is another item of contingent fund of $10,000 applied to the item S, and is distributed through the various items.

In Kansas City they permit the street to be occupied with material, apparatus and debris during the progress of the work; material might have to be rehandled more in the congested district, but that cost is taken care of in the increased price of the average
961 cost of excavation. The item of $10,000 referred to is in addition to the percentage of increase on the average cost used by witness. The street intersections in the congested district would be open for traffic as soon as possible; that would not increase the expense. Excess material would have to be hauled away at an added expense, but that is taken care of in the basic price per yard; the average price covers the entire district; will advise later what the average cost figures were and what percentage was added for purposes of this estimate. Would only puddle in certain places, probably only under pavement; includes surfacing; that would cover practically the entire distribution system. Assumed that water would not cost more than 15 cents per thousand gallons; has not figured that on a lineal foot basis; does not know what the price of water for that purpose is in Denver; does not know that the price in Denver is one cent per lineal foot; would not be interested in what the present water company would charge for the water; the construction would be so arranged that water would be in the pipes; would tamp the backfilling under macadam and asphalt pavement, which would aggregate about 300,000 feet; would not tamp the entire backfilling on the other streets. The usual practice is to tamp around the side of the pipe up to the top of it; if a trench is merely backfilling, it will sustain horses and other traffic; that would be true if water was used, as soon as the water dried out; the length of time for drying out the water would vary with the season and temperature. While it was drying it would be necessary to protect the trench by red lights at night and barriers by day; does not know whether it would take a week or a month to dry out.

Has done work in towns where traffic had to be maintained, and has never had any trouble with it; did not assume that the trench would have to be temporarily planked; would leave the trench naked until the paving was done. The expense of planking the trench would have to be taken care of either out of profit or contingent fund; made no allowance for it. Has not allowed anything for re-excavating the surface of the trench to allow for pavement. (Defendants object to the last testimony. Objection overruled.) Did not figure on replacing in the trench all of the excavating; had to provide for hauling away some of it; the cost of that is covered in the backfilling; has a miscellaneous hauling account, which is distributed to each item as a portion of the overhead cost. Witness' estimate of 16 per cent for overhead and profit covers the smaller

sum of $10,000 for contingencies and the sum of $10,000 for miscellaneous hauling; the sixteen per cent allowance covered supervision, amounting to $4800; the items of the sixteen per
962 cent allowance are: Foreman, $30,000; timekeepers, $4800; material, $7200; warehouse, $4320; insurance, $21,000; bond, $18,000; warehouse rental, $9600; transportation, superintendents and timekeepers, $3840; tool depreciation, $28,000; interest during construction, $24,000, making a total of $181,320. That includes the extra hauling account and the $10,000 contingency account, and the balance of the sixteen per cent was figured as profit. The figures given refer to Class S, and the component parts of the plant were figured separately in that way. Considers the aggregate of $181,320 as a fair allowance for contractor's overhead on the distribution system alone.

The general overhead and contingencies on page 67-*a*, amounting to $370,000, relate to the whole job, and would be distributed proportionately as called for; cannot apply any percentage of that to the distribution system; some part of it should be applied to the distribution system, but witness has not figured it; whatever that percentage is, it would be in addition to the overhead; would be glad to get the overhead profit and estimates which he has made; puts them forward as being fair.

Incorporated the figures on building furnished by Messrs. Willison and Walsh to Mr. Gaffy; they are distributed throughout the different classes; as to them, assumed that the prices given were the prices that the main contractor would have to pay a sub-contractor. Witness thinks his office checked over the quantities used by Willison and Walsh to see if they corresponded with the quantities under the same items in Exhibit C; does not recall whether there were any discrepancies; believes that in some instances there was a confusion, and he used the water company's figures. Witness refers to the Lake Cheesman division, Class C, Exhibit 5; started with item No. 3; has entirely excluded Metcalf and Anderson's estimate of $84,784 for preliminary dam expense, sub-item 6-*a*.

Does not know what Metcalf and Anderson's preliminary expenses include. There would be a water hazard involved in the construction of Cheesman dam; has considered that and included it in the total of each item; although the expenses incurred in a water hazard would be actual cost, witness carries it as a contingency, together with other things that he actually does not and cannot accurately in an overhead charge. It would be essential to build a flume to carry the water, and has covered that in the overhead charges; that is merely witness' individual custom. Witness has an item of $25,000 for contingency and water control; if the material originally in the dam that was destroyed is actually incorporated in the present dam, it should be included in the cost. Witness' information was
963 such that he could not determine the fact as to that; he excluded from the cost of the Cheesman dam all the material that might have been in the old dam and was afterwards incorporated in the new one; the basic figure on the masonry was $2.85 per cubic yard, and covers 102,897 cubic yards; did not deal with

all the masonry as being of the same class; did not use the classification appearing in Exhibit C, but adopted one of his own. Estimated the square feet of facing of the dam on both sides and that gave the cubic yards of faced stone, and added the estimate of dressed stone in the parapet wall, 553 cubic yards, as estimated in Exhibit C; then deducted the quantity of faced and dressed stone from the total quantity, and arrived at the masonry in the balance of the dam. After arriving at the quantities of rubble masonry, figured on quarrying the quantity of stone necessary to do the work; the total of the masonry required, including the mortar, would equal the total cubic yards of masonry in the structure. Witness and his associates determined the quantities of the different kinds of masonry; in the parapet wall the dressed stone is 553 cubic yards, the same as in Exhibit C; 11,305 cubic yards of stone in the face wall, 61,044 cubic yards of rubble stone, making a total of 72,902 cubic yards of quarried stone. Figured the cubic yards of mortar and deducted that from the total cubical contents of the dam, and the resulting figure gave the cubic yards of quarried stone; assumed a total of 103,897 cubic yards in the entire structure; there were 119,670 square feet of faced surface; figuring 3 feet thick, gave 13,300 cubic yards of masonry in the face; adding to that 553 cubic yards specified in parapet wall, gave a total of 13,853 cubic yards, leaving a total of masonry on the back of the dam of 89,044 cubic yards; then assumed fifteen per cent proportion of one to two mortar in the face, which figured 1995 cubic yards of mortar; deducting that from the total faced stone, gave 11,305 cubic yards of faced stone; assumed that 75,700 barrels of cement were used in the dam structure, making a total yardage of 28,000 yards; that amount was deducted from the total of 89,044 cubic yards of masonry, leaving a total yardage of rubble masonry to be quarried of 61,044 cubic yards; adding this to the dressed stone, gave a total of 72,902 cubic yards. Estimated $6500 for opening the quarry, 40 cents per yard for quarrying and breaking up 72,902 yards of stone, 35 cents a yard for transporting it, $1.30 a yard for putting 102,897 cubic yards of masonry in place, $3.10 for plug and feather, facing up stone on the face work, $6.20 for shaping and placing 553 yards in the parapet, 75 cents a yard for the mortar in place, and added $37,523, all of this going to make up the total of $293,256; those are the aggregate figures on the labor and material, excluding
964 the cement; to that is added a total of 26 per cent overhead and profit consisting of superintendence for four years, $9600; bond, $3000; insurance, $18,000; timekeepers and clerks, $9600; utility commission, $3600, contingencies, $25,000; water control, $5000; watchmen, $6000 interest during construction $18,000; temporary diversion dam, $7200; profit, $55,000; total, about $160,000. Added 26 per cent for overhead and profit to each item, going to make up Lake Cheesman, except on those where witness' figures were the same as those in Exhibit C, outside of the item of cement.

Considers 26 per cent a fair and proper allowance for overhead and profit on a job like Lake Cheesman; assumed that the masonry on the

outer face of the dam was exactly the same as that on the inner or upper face, and that it is plug and feather work; did not see the upper face of the dam; it was covered with water.

If the upper side of the dam is faced from top to bottom with stone, having cut face and laid with closer joints than the downstream side, that would not be plug and feather work; it would be more expensive to produce. Has been at Lake Cheesman twice, and stayed about three or four hours each time. On the first visit went through the tunnels and looked at the weirs and bottom portions of the dam; did not check the measurements of the dam; the mixture for the mortar was specified in the specifications for the dam; did not assume that all of the 83,000 barrels of cement went into the dam; deducted 550 barrels for roadway and miscellaneous; after deducting the yardage of mortar in the dam from the total cubical contents, arrived at what witness deemed to be the actual cubic yardage of stone; the unit prices for transportation and quarrying are applied to that difference.

Assumed about 7 per cent waste in opening and flooring the quarry. Figures $6500 for opening a quarry; estimates 72902 yards would be quarried, and that is the rock that actually goes into the dam. Takes care of the waste in the unit price for quarrying the estimated yardage; thinks that there would be added to the unit price of quarrying 7.4 per cent per cubic yard for waste; does not know whether that is the customary percentage or not, or whether 25 or 30 per cent is customary. Has had no experience in building masonry dams except the Hartshorne, Oklahoma, dam, which was built of rubble masonry, called Cyclopean masonry; that was a small dam, quite insignificant as compared with Lake Cheesman. Cheesman dam is constructed of granite; has had no experience in quarrying granite rock. Did not use Walsh and Willison's figures for the buildings at Cheesman, but used the company's figures of $11,-
315. Walsh and Willison's figures were not ready when
965 witness wanted them. Item 5, sub-item D, page 136 of Exhibit C, and page 4 of Exhibit 65, shows an item of $1200 for abating ice in river at dam site; that was allowed by witness on the assumption that such an expense was actually met in the construction. The allowance for overhead and contractor's profit on Class D is 25 per cent, and was added to each item; considered that a fair allowance for that purpose.

Class E, in Exhibit 65 corresponds with same class in Exhibit C; allowed 25 per cent for overhead and profit; in all classes in witness' estimate allowed 25 per cent for contractor's overhead and profit, except Class C, Cheesman, where the allowance was 26 per cent, and class S, distribution system, where the allowance was 16 per cent, and regards that as a proper allowance for each class; at the end of the estimate there is added $370,000 for general overhead and general contingencies. Class F, in Exhibit 65, corresponds with the same Class in Exhibit C, and relates to the South Platte Canon division.

Item 8, sub-item I, refers to material in filter beds; that estimate was made by Mr. Hamilton, and witness has not the details;

is sure that the same quantities were used as are stated in Exhibit C. The rate per cubic yard figures $1.11 as compared with Metcalfe and Anderson's $1.50.

Does not know how the figures on this item were arrived at, but is prepared to vouch for them by depositing a certified check. Witness has confidence in the man who figured them, and is willing to back his estimate with money. Has had no experience with that particular item. Mr. Hamilton has had no experience in such construction since working for witness, but before that time was with the Kansas City water works system awhile; that system uses a slow-sand filter, and the filter designed by Mr. Keirsted; Kansas City plant is strictly mechanical filtration; they use local sand at Kansas City, instead of the more expensive said from Red Wing Minnesota. There would be a marked difference between the Kansas City filter and the one at Platte Canon. The handling of the sand at Kansas City would be an expensive job; it is dropped into the tank; does not know how the sand has to be spread over the Platte Canon filters.

Conduits are distributed among the several classes; conduit No. 1 allowed $19,658.06 for excavation, as compared with Metcalfe and Anderson's item of $43,584.50; conduit No. 1 is a 30-inch wood-stave pipe; figured 83,543 cubic yards of excavation, which is a different quantity than the one shown in Exhibit C; used a unit price of 15 cents per cubic yard for excavation alone; there is some tunnel work on the line, but exclusive of the tunnel work,
966 witness' estimate of yardage is 83,543 cubic yards, as against the estimate of 156,918 cubic yards in Exhibit C, which is also exclusive of tunnel work. Figures on a trench 58 inches wide, 61 inches deep, and a yardage of .912 per cubic yard of trench; that allows one foot on each side of the pipe. In fixing the depth, aimed to get a cover of 27 inches. Mr. George checked up the estimates of yardage with the profiles, and witness thinks they check with his estimate.

Would make eighty-five per cent of the conduit lines with a trenching machine, and fifteen per cent by hand; allowed the company price for the 60-inch intake at South Platte; has either figured that as hand trenching or allowed the company price on it.

As to Class II, figured that eighty-five per cent of the conduit could be done by trenching machines and fifteen per cent by hand, at a cost of 15 cents per cubic yard; will take up the other conduits when they are reached.

The estimate of 15 cents per cubic yard is an amalgamation of the cost of hand and machine trenching; cannot state what the unit price for the machine trenching was; does not know whether he has the figures with him, but will figure it; applied the same unit cost for machine trenching on all the conduits; took the Gaffy estimate on the cost of wood-stave conduits in place, but made his own estimates on excavation and backfilling; has not laid any wood-stave pipe, has never done any trenching in Colorado. If the trenches are cut with machines, they will have to be vertical walls, and figures on making vertical walls in the hand work. Witness himself looked over the profiles of the trenches, on file in the water

company's engineering department; did not figure the quantities from the profiles; believe that his figures show that his ratio of excavation to the excavation of the water company corresponds comparably with the width of trench used by the different men. In Class H, item 4, subdivision E, witness omitted through mistake 17,325 linear feet or 15,700 cubic yards of excavation; witness' figures or eighty-three thousand and some hundred cubic yards for trenching in Class H, would compare with Metcalfe and Anderson's figure of 137,500. There is also 1065 of tunnel excavation, on which the unit price of $3 per yard was applied; the yardage for the cast iron pipe trench should be added; did not figure on the sloping side trenches; was not aware that that was the standard form of construction used by the water company; figured on trenches which would allow one foot on each side of the pipe. The water company sections allow one and one-half feet on each side; the people
967 who gave the price of wood-stave pipe in place said that all the room that would be required for making it would be one foot on each side of the pipe. Exhibit C shows excavation of wood-stave conduit done by machine with vertical sides. Mr. Gaffy gave the figures on wood-stave pipe; did not know that Gaffy figured on using a trenching machine and subsequently sloping the sides of the trench. Trenching machine would not cut the full size of the trench on the bigger pipes, and some slope would have to be put on the trenches. If the trenches were made with a slope of "one on four" it would increase the excavation.

Witness ACHERT BICKEL on the stand.

Cross-examination continued by Mr. Dorsey:

Is not able to give the details about the cost of the excavation and backfilling on the conduits; witness finds he made a mistake in saying that he had omitted excavation for cast iron pipe in Class H; made figures on each class from C to S, as if each one was a separate job, figured overhead and profit on that class, and distributed it among the items.

The overhead and profit for each class was 25 per cent, except Cheesman, which was 26 per cent, and the distribution system, which was 16 per cent; the overhead included in that percentage is designated "Field overhead" as distinguished from general overhead and contingencies; the percentage of profit and overhead is based on the cost.

Whenever Willison and Walsh's figures have been used in making up Exhibit 65, they are the identical figures set down in Walsh and Willison's Exhibit 61, and no contractor's overhead or profit has been added to them; would think it would be fair to add that item. Would apply not to exceed five per cent to the Willison and Walsh estimate. Accepted Mr. Gaffy's figures on the cost of the wood-stave pipe and the cost of laying it. Witness had estimated that Gaffy's figures given to witness included contractor's profit and overhead; as to most of the items in witness' estimate, he assumes that he would do the work himself; that is true as to excava-

tion and backfilling, and as to those items adds 25 per cent to cover overhead and profit. If the figure for wood-stave pipe and laying is a mere basic cost price, then there should be added a percentage for overhead and profit. If Mr. Gaffy's figures include a contractor's overhead and profit less than witness' estimate of 25 per cent, witness should either add the difference or treat Gaffy as a sub-contractor and add a general contractor's profit. Would not add to exceed five per cent. Witness referred to page 52 of Exhibit
968 65, Class O, item 4, sub-item G, corresponding to the same item on page 334 of Exhibit C, concrete lining for reservoir No. 1, Capitol Hill; assumed 1520 cubic yards of concrete, the same as in Exhibit C; allowed $10,564 for laying it and hauling it. The unit price of hauling and laying that material was $7 per cubic yard; the cement would cost $1.55 per barrel, delivered at the work, which would be $1.37 f. o. b. Denver. The hauling would be 18 cents per barrel; storage and handling is included in the general overhead charges on the job; the price on the cement is the October 14th quotation.

Is not interested in average prices; assumed that gravel would cost $1.95 a cubic yard at the work, and sand would cost 75 cents; labor was figured at $1.50 a yard; figured the sloping sides and the bottom of the reservoir on the same basis; allowed 23 cents a cubic yard for water; 35 cents a yard for scaffold and incidentals; the total cost units would be $5.56 per cubic yard; the bid price is $7; assumed a mixture of 1-3-5; would require 1.17 barrels of cement to the yard; cement would cost $1.82 a yard. Does not want to do any more figuring under forced pressure. Refers to Exhibit 65, page 53, Class O, item 5, sub-item B, corresponding to Exhibit C, page 335, excavation for Capitol Hill reservoir; estimated 90,700 yards of earth and 10,000 yards of shale; 16 cents per cubic yard for excavating the earth, and 30 cents per cubic yard for the shale; the actual cost unit for this work figured out 20 cents and 37½ cents on the two classes of material. On the embankment, uses the 20,800 cubic yards as given in Exhibit C, and applies unit cost of 3 cents. Assumed a waste haul on 76,300 cubic yards, average haul 1,000 feet, unit price 10 cents per cubic yard, and the bid price would be 25 per cent higher than that; used the yardage of concrete (4,780 cubic yards) appearing in Exhibit C, but made an independent estimate of the hauling. Referring to Ashland Avenue reservoir, page 55 of Exhibit 65, Class P, item 3, sub-item A-1 and A-2, Exhibit C, page 348, witness' estimate includes the roofs; took the figures out of Exhibit C for asphalt paving, $25,830; stone footing, $1,010, and stairs and platform, $25, making a total of $26,865; the items rejected by the witness and estimated for himself are principally the excavation and the roof. The basic cost on excavation was 17 cents, to which was added the percentage for overhead and profit. There is a small item of stripping at 15 cents a cubic yard; on basin two there are 1,650 cubic yards of stripping, and 71,952 cubic yards of excavation; in the roofs estimated on basin No. 1, lumber in roof and framing, 337,000 feet, board measure; that checks with quantity in Exhibit

C. The unit price on the lumber was $19.85 plus $12; to
969 that should be added the percentage; on the east basin, assumed 300,000 feet, board measure, and applied the same price.

As to the Littleton mill, accepted the item of $11,535 under item 5-B, Exhibit C, but omitted freight, $750; erecting machinery, $3,000; contractor's profit $2,350; those figures should be added; is not yet ready to take up conduit matters. Witness has omitted from his estimate the crossings under street car tracks; there should be an addition on that account of $12,000, which is the estimate in Exhibit C.

Referring again to Class H, item 4-E, page 26 of Exhibit 65, and page 215 of Exhibit C, witness' estimate is $19,658.06 as compared with Metcalfe and Anderson's estimate of $43,484. Witness took care of the excavation for the cast iron pipe in his estimate for laying the cast iron pipe, item 4-B, $41,221; the total of item 4-B is $141,221.50. That item excludes excavation.

In regard to conduits, witness used the vertical-side design, and figured his excavation quantities on that theory, but they maintain a definite ratio throughout to the quantities in Exhibit C; for example, on the 30-inch pipe, witness estimates .912 cubic yard per foot of trench, which is 79.3 per cent of the yardage per foot of trench used by Metcalfe; on the 34-inch pipe the yardage is 1.37 for a depth of 5.6 feet, in Exhibit C, but witness estimates 1.105 or a ratio of 80.7 per cent; 40-inch pipe, Metcalfe and Anderson have 1.52 cubic yards per linear foot, and witness has 1.3243, or a ratio of 81.7 per cent; 48-inch pipe, Metcalfe and Anderson yardage is 1.87, witness' 1.54 ratio 82.5; 24-inch pipe, Metcalfe and Anderson's 1.031; witness', .78, ratio 78.5. This covers all the sizes except the trench in which the witness used the company's figures. In multiplying Metcalfe and Anderson's total excavation by witness' ratios, it gives the figure based on witness' assumed width of trench. In conduit No. 1, found a discrepancy of 2,500 yards; in conduit No. 2, a discrepancy of 3,208 yards; in conduit No. 3, a discrepancy of 2,800 yards; and, among other things, found that there is a discrepancy of 2,400 yards between the company's checking and the backfill on conduit No. 3; that is Class H, item 9-*a* and 9-*j*, pages 238 and 240 of Exhibit C, where it appears that there are 2,474 yards more of excavation than there is of backfill, and on checking, witness finds there is a total of 23,368 cubic yards to be added to his estimate of yardage on the conduit system. Conduit No. 1 is figured at 15 cents, for 85,534 yards; conduit No. 2, in Class G, 15 cents for 11,431 yards; conduit No. 2, 30-inch branch, Class G, 1,643 yards at 15 cents; conduit No. 2, 30-inch branch in Class G, 30 cents, for 2,233
970 yards; conduit No. 2, 34-inch, Class H, 94,353 yards, the same as water company's 114,603 yards; and then there is an item of 34-inch conduit, 12,705 yards at 23 cents, for excavation and backfilling; the other is excess cuts, 16,135 yards at 15 cents; conduit No. 2, 20-inch branch, in Class H, 6,302 yards at 15 cents; conduit No. 3, Class H, 118,017 yards at 15 cents; conduit No. 3 extension, Class H, 30-inch, 10,097 yards at 25 cents, and 67,037

yards at 20 cents extra fill, branch conduits; conduit No. 3, 7,704 yards at 25 cents; conduit No. 3 cross-section, in Class H, 1,250 yards at 25 cents; conduit No. 4, clear water conduit, in Class M, 48-inch pipe, 14,800 yards at 18 cents; 40-inch pipe, 10,500 yards at 18 cents; 440 yards of rock at $1.50; conduit No. 5, in Class L, 62,600 yards at 18 cents, 1,556 yards at 75 cents; 1,415 yards of rock at $1.75; conduit No. 6 extension, Class K, 1,738 yards at 18 cents; No. 6 clear water extension, Class K, 10,620 yards at 18 cents; No. 6, clear water, Class K, 40-inch, 7,830 yards at 18 cents; 48-inch, 90,000 yards at 18 cents; 4,697 yards of rock at $1.75; conduit No. 7, in Class E, 48-inch, 81,000 yards at 15 cents; 48-inch cast iron, 1,077 yards at 15 cents; 4,200 yards of burrow at 18 cents; conduit No. 8 in class H, the same figures as in Exhibit C; conduit No. 8, 34-inch, from Bear Creek to Harriman ditch, 1,940 yards at 25 cents; 984 yards loose rock at 85 cents; 312 yards solid rock at $1.50; prices given are for excavation only, except in the one case where 22 cents was given for excavation and backfill. On top of this unit cost there was 25 per cent added for profit and field overhead.

Cannot separate the price per cubic yard for trenching machines. Prices given represent the average cost per cubic yard; cannot state how much would be hand work and how much machine work. The costs were made up by Mr. George, witness' general superintendent of construction, and witness cannot find the notes and cannot state the basis for the different classes of work.

Witness has confidence in Mr. George's estimates, and is ready to back them. The backfill is estimated at 10 cents and 6 cents; does not know how it is applied, except that 10 cents applies to that portion of the trench which is backfilled or tamped to the spring line. Thinks Mr. George took the requirements of Exhibit C for tamping to the spring line, and therefore made a difference in prices.

The yardage of backfill was determined in each case by the same process that was used in determining excavation, and the backfill estimates will have to be corrected exactly in proportion to the corrections in the amounts of excavation. Does not know how Mr. George expected to do the backfilling. Witness makes any corrections in his estimates of buildings that Walsh and Willison
971 make, and calls attention to one correction of $1,850.

Figured on reproducing Lake Cheesman in four years; that would be the period of time that the contractor would be at work.

(Witness was then asked as to the period of time the company would be required to spend prior to the beginning of construction work, to which objection was made. Objection was overruled.)

The period of four years would begin when the contractor begins his work; the company would have to acquire the land and prepare the plans and specifications before the contractor would begin his work; did not assume that the contractor would have anything to do with acquiring the lands; assumed a period of two years' construction on the distribution plant, and that would be the period of actual construction; does not know what the period of actual construction would be on Marston lake.

Witness ACHERT BICKEL resumed the stand for further

Redirect examination by Mr. Stevens:

Before adding the prices on the buildings to the total estimate, witness included all overhead, interest and other charges which would properly attach to those items. Has corrected his estimate to include all omissions, and is willing to reproduce the plant for $8,662,440. Has added five per cent on the buildings estimated by the architects, $9,648; on Lake Cheesman buildings, accepted the company's figures; increase in conduit excavation, $6,150; on street-crossings, Class S, item 21-I, accepted the company's figures of $12,000; accepted the company's figures on Class J, Littleton mill, and added $6,100, which was previously omitted, making a total of $85,880 added to the first estimate.

Recoss-examination by Mr. Dorsey:

Has not added anything because of increased width of cuts in pavement; has not added anything because of constructing the trenches with sloping sides; the correction in excavation relates to quantities which witness spoke of in cross-examination before; does not include any estimate on account of material in the old dam that was included in the new Cheesman dam. Class O, item 8, sub-item G, page 52 of Exhibit 65, and Class O, item 5, sub-item G, page 53 of Exhibit 65, relating to the concrete linings of the two Capitol Hill reservoirs, witness undertakes to make the tabulation and bring it in.

972 Witness ACHERT BICKEL resumed the stand for further

Recross-examination by Mr. Dorsey:

Witness produces a tabulation which shows Capitol hill concrete costs to be $5.56 per cubic yard, to which is added a profit and field overhead of 25 per cent, making a unit cost of $7; the figures are tabulated and set forth on pages 4,317 and 4,318.

JOHN F. VALLERY, a witness for the defendants.

Direct examination by Mr. Stevens:

General agent of the C., B. & Q., for ten years; in charge of freight department in Colorado.

Rule of the company is to absorb the switching on competitive business in carload lots. If a carload of iron, steel, or manufactured goods was to be sent from Chicago or Pittsburgh to Denver for delivery on the switch of some other line, would make that switch and absorb the switching—that is, pay for the switching. If desired, would set the car for unloading on any of Burlington's own team tracks.

Cross-examination by Mr. Dorsey:

Have a number of team tracks between 14th, 15th and 23rd Streets, and one at the Stock Yards, which is used to some extent.

Would set cars on a track of the Burlington at any convenient location. Have published a schedule of rates covering such service, under general switching schedules; it is approved by Colorado Utilities Commission and Interstate Commerce Commission; it specifies Denver, or within switching limits; deliver to the Stock Yard tracks and on new Market Street line; would have to secure permission from the city to have merchandise unloaded from car on the Market Street line; the company has some property of its own on Market Street line, where it could set the cars and unload them.

Would set cars at a distance from terminal, on the outskirts of the city, if they came in over Burlington; if they came over some other road, would not set them except on team tracks; connecting line would pay the switching charge. If the consignee did not have his own team track, it would be set on the company's team tracks. The absorption by the line-haul carrier of charges made by connecting switch carriers is a matter of convenience between the railroads, and obtains on carload business only. There is a published
973 switching tariff in Denver calling for payment of 20 cents a ton, with a minimum of $2 per car; that is a reciprocal switching tariff. On very low-rate commodities from non-competitive points, would not absorb the switching, but would set it to a team track. If a carload of some commodity arrived in Denver at an ordinary point of delivery in the yards, and the consignee desired to have it switched at a distance from that point of delivery on the Burlington's own track, that would be done without charge.

Does not regard all side tracks in the switching limits of Denver as team tracks, except for own use. Would furnish a shipper with what would amount to a private spur, at the company's cost, and make the switching to that spur without an extra cost. That practice has been indulged in by the Burlington to a considerable extent.

Redirect examination by Mr. Stevens:

Thinks that is the general custom.

JOHN H. BRADBURY, a witness for the defendants.

Direct examination by Mr. Stevens:

General auditor of the Colorado & Southern about nine years; is familiar with the methods of accounting described by the Interstate Commerce Commission with regard to depreciation of property. (Rest of page devoted to discussion between Mr. Dorsey, Mr. Stevens and the master.)

Discussion continued.

WILLIAM W. BARNETT, a witness for the defendants.

Direct examination by Mr. Stevens:

In the automobile business since May, 1906, selling, garaging and repairing; handles the Federal, Standard, Sternberg and G. B. trucks; keeps them repaired; a five-ton Sternberg truck could be laid down in Denver in lots of two or more at $4,850 each, with an ordinary body; life of five to ten years.

Use of trucks for 10 months in the year, 22 days in the month, for hauling water mains of various sizes and building material, would not be different from the usual service for a truck, and a truck in that service should last five to ten years. If used 7 months in the year, and 22 days in the month, life would be prolonged in proportion. Most truck operators figure a life of ten years; trucks are governed to a speed of 8 miles per hour. Has an esti-
974 mate of the cost per ton-mile for the operation of a five-ton Sternberg truck, on the basis of 7 months a year and 22 days per month; the total cost per ton mile of five tons over 40-mile route, 20 miles each way, is practically 10 cents.

On 10 months basis, it would be 8.16 cents per ton mile, and the items upon which the estimate is based are contained in Exhibit 67.

Cross-examination by Mr. Dorsey:

Witness is automobile dealer; his business is to sell automobiles and trucks; does not operate them. Since 1908 has been engaged in the commercial end of the business, handled the American Locomotive goods until they discontinued manufacture of trucks, and afterwards adopted the Sternberg and Standard. There are no large trucks in Denver that have been operating for five years. The Hungarian Flour Mills truck was put into service January 1, 1913, and has been in service two years; the Denver Fire Clay truck went into service three or four months before that, and the Woodman of America truck at Colorado Springs went into service three years ago.

The life of a truck is determined from what is known of actual conditions elsewhere and personal observation of what witness has been able to see here. The witness has an estimate of the cost to operate the Hungarian Mills truck for practically two years' time; the truck has been in witness' garage; has had his men drive it; has done all the repairing on it; furnished all the gasoline and oil; is interested in the success of the truck business in Denver, and has watched the Hungarian Mills truck very closely. Witness' statement here is based on the operation of the Hungarian mills truck, but cannot say that it is based exclusively on that; there is a similarity between all. Hungarian mills truck has been kept for two years at witness' garage, and witness' mechanics have had charge of it; has been interested in keeping it in good condition and showing a good result. It is used for delivery of flour and grain; practically used for the delivery of flour only, from the mills to grocery stores about the city; truck never gets off the city streets.

Has never sold any to contractors; does not think there will be any worse conditions in delivering pipe and conduits than the city streets

were last winter; down on 8th Street, where the mill is, in the Highlands, where there is adobe, it is bad; the truck delivered through such streets both winters; were tied up for three days only during the snow of December, 1913, but their radius of delivery was lessened, and when it was impossible to get wagons through.

Is advised that the road from Buffalo to Cheesman dam can be put in good condition, and that there is an estimated allowance
975 of $25,000 to construct the road, also an allowance for keeping the road in condition. After this expenditure, it would be a fifteen per cent grade; was told that the truck would be for delivery in the city of Denver, and none of the deliveries would be over two miles from the distributing station, of which there would be eight; was not advised that the average haul would be two miles; truck will work wherever it has a bottom. The conditions are different wherever there is adobe, or it is impossible to get traction; thinks it is pretty sandy along the Platte Valley; there is some adobe, pretty sandy when you get to the river bottom; sand and adobe make a good road bed for a truck; never calculated how long it would take to get a road in condition for trucks.

It doesn't take long to make new natural roads on the prairies; has not operated trucks on the prairies where there are no roads; repairs increase with age of truck, but not materially; trucks are made with bushings, and the bushings that are replaced at 5000 miles would be the same that are replaced at 20,000 or 50,000 miles; there is a governor on the motor which will regulate the speed to 8 miles per hour.

A five-ton truck would maintain that speed regularly under all normal conditions. A truck is different from a pleasure car; they are geared to handle loads with a motor; they may slow down a bit on the hills, but not perceptibly.

The conditions in the city and loading and unloading would reduce the average speed.

In arriving at ton-miles, divide the entire cost of one day's service into the entire mileage that the truck has made; witness takes one-half of the miles covered in a day by the truck when the trucks are traveling with a five-ton load, and the other half when the truck was traveling back empty to get another load; and is asked if it is not necessary to divide the total cost for the day by one-half of the miles traveled in the day, to which he answers that his estimates have always been based on the fact that the trucks have to travel one way loaded and in some instances loaded both ways.

If the total cost per day is divided by the total number of miles traveled, the figure arrived at would show a doubled cost per ton-mile. In the water works job, would have to go empty one way and loaded another; there would be a slightly greater cost operating at a higher altitude.

Sixteen cents a gallon for gasoline is a very conservative price at Buffalo, if bought in quantities; considers estimates conservative; figured interest at 6 per cent on the entire time, regardless of fact that 20 per cent of the cost of the truck is written off each year. The item of $400 for tires means that new tires are put on for
976 every 7920 miles, but tires will last ten to twelve thousand miles; expects to have a highway without rocks. On the

Cheesman work there is a little over 6000 miles for the trucks to go; these same tires would last two years, but figure they would be replaced every year; figure two and a half miles to a gallon of gasoline, and thinks service will do better than that.

FRANK O'RYAN, a witness for the defendants.

Direct examination by Mr. Stevens:

Salesman for the Allis-Chalmers Manufacturing Company, for pretty nearly five years; handles flour-mill machinery, mining, electrical, and so forth; is familiar with the price of flour-mill machinery laid down in Littleton; examined the machinery in the Littleton flour mill last month, and made a detailed estatement of the cost laid down in Littleton, and the installation.

Identifies Exhibit 69; compared the items in Exhibit 69 with similar items in Exhibit C. The following items in Exhibit 69 are not in Exhibit C: Two bins, a couple of spiral scoop conveyors, an Alsop bleacher; the prices put opposite these items would have to be deducted to make Exhibit 69 correspond with Exhibit C. The total deduction on account of these items would be $585.75. The value of the machinery new, f. o. b. cars Littleton, would be $9741.89. Allowed forty per cent depreciation, which was arrived at by an inspection of the conditions of the machinery. On a basis of five per cent depreciation each year, the forty per cent is a liberal allowance, in view of the 20 years' service of the machinery. Figured $2000 for spouting, conveyor boxes and hardware.

Total value after deducting depreciation and adding $2000 mentioned would be $7845.13. Material was estimated at regular selling prices without competition. If the business was needed real bad, it could be reduced fifteen to twenty per cent. Recently lost a bid on a mill where competitors bid five per cent below witness' figures; witness used the same discounts that he uses on his present estimate.

Cross-examination by Mr. Dorsey:

In very close competition it is usual to shave our present estimates fiifteen or twenty per cent; sometimes lose money; all companies that carry on business lose money on some jobs in order to keep the organization together. In case of shaving price fifteen or twenty per cent, would get authority from headquarters; does not do that in the majority of business done; did not mean to say that it was
977 the custom to sell goods on a basis of fifteen to twenty per cent less than list price and list discounts. The system of regular discounts is customary. The catalog contains base prices, but from time to time cost of raw material changes, so the discount is varied. If the conditions should so change that the list price is low, the bulletin is revised. The reader of the catalog knows that the list price is a base price, and then he writes for a discount.

In preparing Exhibit 69, various discounts were applied to different articles; on iron pulleys, up to 12 inches, there is a discount of 50 per cent from list price; from 13 to 24 inches, a discount of 25 per cent, and so on. The net prices so arrived at are f. o. b. factory, Milwaukee. $600 is estimated for freight, being 60,000 pounds at $1 a

hundred. To be accurate, the tariff rates is 80½ cents. The item of $2000 covers hauling from railroad to mill. There is about $1800 of that for erecting machinery and testing it. Witness has had no experience in erecting flour mills, but he has as salesman and estimator. Has made sales of flour-milling machinery; has sold from $100,000 to $125,000 worth of such machinery in the last three or four years, some of it the Littleton mill type; mostly additions to existing mills; 100 different sales; the largest customer is the Colorado Milling and Elevator Company. There is not a great fluctuation in prices. The price on the Sampson-Leffel water turbine is the price at which we would be glad to take an order today. Has had the same price sheet for five years; does not know that the discount has been changed for five years. After taking off discount, there is still left an agent's profit. The change in discount has been in belting, transmission machinery and so forth. The range in variation has been from five to ten per cent up and down; these changes occur with some frequency. The prices used in witness' estimate are present-day prices, that do not vary very much. Belting is worth more than it was two years ago, transmission machinery, pulleys, etc., are selling five per cent lower.

Witness makes estimate for furnishing machinery and the erection and installing of it. There would be a profit to the company of ten per cent in the gross estimate of $9141.89; this profit includes all the Allis-Chalmers Company's overhead expenses and everything of that sort. This is true as to purchased items, but not as to other items. The figures given are those at which the material would be sold to somebody else. Do not figure on making anything on installation; do that at actual cost. The only profit is that on the sale of the material; the Allis-Chalmers people will erect a mill, adding merely the cost of erection to the sale price of the materials purchased from them; do this as a regular practice. There is nothing listed
978 on Exhibit C which is not in Exhibit 69. Checked list as shown in Exhibit 69 with Exhibit C, but did not take Exhibit C for inventory; made his own inventory.

On the first floor there is a Great Western roller mill, and witness took the price of the same size Allis-Chalmers mill and of the Nordyke-Marmon machine; the Great Western is a much cheaper machine than the Allis-Chalmers; has not the list price on four double-stand roller mills, appearing on his list, nor can he state what discount he applies.

There are other instances where a substitute article has been figured upon. Made deductions on account of depreciation. When speaking of depreciation of five per cent a year, means that is customary as a matter of accounting. The Littleton mill machinery is over 20 years old. According to that theory, it would not be there at all, but it has received good attention; is in good conditions, with the exception of a few belts or bearings.

The depreciation depends upon the care the machinery has had and the work it has had to do and the local conditions. Figured the forty per cent depreciation from inspection. Machinery would be worth estimate as it is now; mill ready to run. It is in efficient operating condition. When witness was there the feed mill was run-

ning. Was not water enough to run the flour mill. Spent day and a half at the mill.

Redirect examination by Mr. Stevens:

If the mill was dismantled and machinery sold, it would bring about twenty per cent of the original purchase price, at which witness estimated it.

Exhibit 69 introduced in evidence.

979 In the District Court of the United States for the District of Colorado.

In Equity. No. 6274.

THE DENVER UNION WATER COMPANY, Plaintiff,
vs.
THE CITY AND COUNTY OF DENVER et al., Defendants.

Witness HOWARD C. MALONEY.

Direct examination by Mr. Dorsey:

Am in charge of the service department of the D. U. W. Co. It is the department through which the relations between the company and consumers are initiated. The company rarely comes in contact with the actual consumer. It meets the plumber representing the consumer. Applications for service are filed and recorded in my department.

Have recently made an investigation to ascertain the cause of alleged poor service received by certain consumers, who gave testimony in this case on behalf of the defendants, for the purpose of determining the cause of service defects, if such existed.

In the case of Chas. J. Munz, 1192 So. Gaylord St. Since 1911 Mr. Munz service has been under the South Denver Pumping station and should be very good. His premises are located on South Gaylord St. between Mississippi Avenue and Arizona Avenue.

In the Case of Michael Finnerty, 1417 Gaylord St. Service was applied for in 1891 by W. L. Hallett. Original application was for a ½ inch tap, size of service pipe and size of building not given, but called for two lots of ground. A ½ inch service
980 pipe was attached to ½ inch tap. Service now supplies 16 room house, 1 bath, 2 closets, 66 2/3 feet of irrigation. Service was inadequate for the duty when installed. Dec. 2, 1914, I made a test of the pressures inside the house with certain of the fixtures open for the purpose of ascertaining the effect of draught of water on the service. Pressure on the service pipe in the street, with no draft being made, was 85 pounds and in the bathroom on the second floor of the house was 77½ pounds. With one faucet open in the laundry tub the pressure on the service pipe in the street was 83½ pounds and there was no water on the second floor of the house, indicating that the plumbing was too small to supply water

and maintain pressure. After this test I flushed the service, cleaning out the pipe, and with the same pressure on the service pipe in the street and the same draft in the basement, maintained a pressure of 12½ pounds on the second floor. The pipes that caused the deficiency in the service are the property of Mr. Finnerty.

In the case of J. P. Donley, 1922 E. 14th Ave., and 3035-37 Julian Street. Application for 14th Avenue premises filed in June 1892, by T. F. Kane, for 5/8 inch tap for builders use. Size of service pipe or premises not given. Installation made as applied for and an eleven room house, one bath, one closet, and 33 feet of irrigation supplied. Later in 1892 Mr. Kane built another house at 1928 E. 14th Avenue, the water supply for which was taken from the service pipe supplying the original house at 1922. This service pipe was only ⅝ of an inch in diameter, being the same size as the tap. The service now supplies 2 eleven room houses, 2 baths, 3 closets, and 83 feet of irrigation. The service pipe is too small for the demand made upon it. Installation was made in that way to avoid the few dollars additional expenditure that would have been necessary to install separate service for the second house which would have been allowed by the company at any time upon application.

A similar situation exists in the case of Mr. Donley's Julian Street houses. In June, 1895, Mr. Donley applied for a ½ inch tap to serve one 9 room house, 1 bath, 1 closet, on three lots. April, 1902, there was added six rooms, 1 bath, 1 closet, and 69 x 75 feet of additional irrigation, all of which is served through the original service pipe, without increase in its size. The service is simply overloaded by the additions placed upon it.

In the Case of J. F. Steadley. 642 High Street. Service applied for July 9, 1909. ½ inch tap, ⅝ inch service pipe for seven rooms, 1 bath and 1 closet, 1-1/10 lots. Pressure test on these premises showed 31 pounds where the service pipe enters the base-
981 ment and 29 pounds at the laundry tubs in the rear of the basement. With one faucet open in the laundry tubs the pressure at the tubs dropped to 3¼ pounds and remained at 27 pounds where the service pipe entered the basement. With one faucet open in the laundry and one faucet open on the second floor, water would not reach the second floor though the pressure on the service pipe remained at 19 pounds, sufficient to raise the water 40 feet. The second floor is not more than 18 feet above the basement, showing that the defect is in the plumbing in the house where excessive lengths of ½ inch pipe are used together with an excessive number of fittings. The pressure being lost in overcoming frictional loss in these excessive lengths of small pipe

In the case of the Kensington Apartments, 1671-75 Logan Street. Service applied for July 11, 1907 for 1½ inch tap, 2½ inch service to supply 125 rooms, 19 baths, 19 closets. Service now supplies 125 rooms, 24 baths, 24 closets, 93 feet of irrigation, in the apartment building, also supplies hot water and heat to an adjoining rooming house containing 22 rooms, 2 baths, 3 closets. An increase of about 33 1/3 per cent on the original service demands. I made pressure tests

there to determine the cause of inability to get water on the third floor of the building. Found a pressure of 43 pounds on the service pipe where it entered the building. With four faucets out of 24 in the basement laundry tubs, open, there was a pressure of only two pounds in the bathroom on the third floor while a pressure of 39 pounds was maintained on the service pipe, or sufficient to raise water about 87 feet. The bath room fixtures on the third floor are from 25 to 27 feet higher than the service pipe, indicating that the defect is in the reduction in the size of the pipes inside the building, which are too small to supply the demand made upon them. The complaint is confined to the flats on the East side of the building farthest from the service pipe.

In the case of M. E. Rumery, 1912 Logan. Application made June 15, 1891, for ⅝ inch tap, size of service and use not stated. The house as originally constructed contained 7 rooms, 1 bath, and 1 water closet, no irrigation. In 1893 this was increased to 9 rooms, 1 bath, 2 water closets, 25 feet of irrigation. Later the premises at 1918 Logan street were attached to the same service, which now supplies two nine room houses, two baths, 4 water closets, 50 feet of irrigation. The service pipe is only ⅝ inch in diameter, the same size as the tap. Proper practice requires the installation of a service pipe larger than the tap. I made a test at these premises to ascertain the cause of the service defects. The pressure on the service
982 pipe in the street was 56 pounds. With on faucet open on the 1st floor at 1912 Logan the pressure on the service pipe remained stationary at 56 pounds and a gauge in the bath room on the second floor showed a pressure of only 2 pounds. Opening one faucet in the kitchen at 1918 Logan street shut off the water on the second floor of 1912, while the pressure on the service pipe in the street still remained at 56 pounds, indicating that the defect was in the size of the service pipe and the plumbing in the buildings.

In the case of J. S. Whitside. 1625 Clarkson St. Application filed June, 18, 1906 for a ¾ inch tap and 1 inch service pipe to supply 24 rooms, 6 baths, 6 closets. Made a pressure test at these premises to determine the cause of irrigation service defect. Pressure on the service pipe in the street was 50 pounds and in the bath room on the second floor, 42 pounds. With three faucets open, one in the basement, one on the first floor, one on the second floor, the pressure on the second floor showed 6¼ pounds and on the service pipe 46 pounds, indicating no trouble on the service in this portion of the building. I then made a test of the irrigation service which is attached to the pipes supplying the janitor's apartments. This being the service regarding which complaint was really made. With one faucet open in the kitchen sink, one in a bath and one in the laundry, the pressure at the sill cock where hose for sprinkling is connected, was only 2 pounds, while the pressure on the service pipe remained at 46 pounds, indicating that the irrigation difficulties arise from taking the irrigation connection from ½ inch pipes supplying other service in the building, instead of directly from the service pipe. The pressure being lost in frictional resistance in long runs of small pipe.

In the case of Micheal and Thomas McGovern. 530 19th Ave. Application filed August 21, 1897 for a private pipe connection to supply a new building. A ⅝ inch tap was made to which was attached a ¾ inch service pipe which ran across the street and branched two ways to supply six, eight room terraces, 6 baths, 6 water closets, and 200 feet of irrigation. November 28, 1914. I made a pressure test at these premises to determine the cause of the service defects complained of. Found the pressure on the service pipe in the street to be 49½ pounds and with no water being drawn there was a pressure of 42 pounds in the bathroom of the second floor of 530 19th Ave. With one faucet open on the first floor the water ceased to run on the second floor though the gauge on the pipe in the street still showed 49½ pounds. After cleaning the service there was a pressure of 2 pounds in the bath room on the second floor with the same faucet open. While this test was being made the other five houses on the private pipe were shut off. A number of other tests on houses nearer the point where the private pipe comes in from the main showed considerably better results than in the house occupied by the McGoverns themselves which is farthest away from the mains. In all the tests the pressure on the private pipe remained constant at 49½ pounds. Trouble is caused by the fact that the demands of the service to the individual houses are about 4 times the capacity of the private pipe supplying them. The trouble could be remedied by instaling a separate service pipe direct from the main to each of the houses. There is no reason except the cost of such installation to prevent its being done. Mr. Donley complained to me about the service at his Julian street residence. I told him he had made a mistake in connecting the second house there to the original service and advised either enlarging that service or installing a separate one for that house, which if done would have remedied the trouble. He did not do it. Mr. McGovern also complained and I advised him to enlarge his service but he did not do it. None of the others have made complaint to me.

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Cross-examination by Mr. Stevens:

I have in the office of the D. U. W. Co. probably the most complete testing plant in the United States for determining discharge capacity of pipes in connection with water service. Under the rules of the D. U. W. Co. no connections can be made with its pipes without written permission from the company. The tapping of the mains is under the exclusive control of the company. Under the rules of the company the manager of the company is empowered to determine the size of the tap to be inserted in the main, that rule is not enforced however. We do not make a test to determine the size of pipe required in the case of every service application. Tests are general for the purpose of obtaining information as to average conditions.

We do not prescribe the size of tap to be used. We advise the size. In the earlier history of the company we permitted any installation that was requested and only began to advise in the matter of size of service when we discovered service troubles due to the failure

of plumbers to install proper sized pipes. The practice of advising size of service began in 1902 or 1903. In each of the cases complained of here where installation was made subsequent to that time, the size of the service pipes were ample and the deficiencies occurred in the plumbing inside the houses. We do not attempt to exercise any control over the plumbing within the house. We instruct the plumbers that in figuring their connections they should figure a certain size tap and a certain size pipe for a given size house and grounds. We do this to avoid their putting in too small a service. These instructions are general in character. If a plumber insists on
984 installing a service that we do not think is proper we require the owner to sign in connection with his application an agreement as follows: "I hereby agree if permitted to lay a certain size pipe (that was specified) in case of leak or failure of pressure I will make no complaint to The Denver Union Water Company."

It is not to the interest of the Water company to have the service pipes and taps as small as possible. It is the business of the company to furnish good service and more to its benefit to furnish good than poor service. It is, of course, our purpose to hold the plumbers to the smallest pipe that will furnish an adequate amount of water. If the main in the street is inadequate to supply the water demanded of it the pressure will not be maintained. We have a rule that requires separate stop boxes on branch pipes where more than one building is supplied by a single service. That rule is simply for the purpose of providing means of shutting off the water from the individual houses, in case of necessity, without shutting it off at the main service pipe that supplies the several houses. This rule requires additional fittings on the pipes and unless the pipe size is proportioned to these they would affect the carrying capacity of the pipe. The fittings necessary to connect the company's mains and to shut off or turn on the water through the service pipe are purchased from the company by the consumer. Prices varying according to size. The purchase price of the tap includes also the labor of making the connection with the main.

When complaints of inadequate service are made we send a man out to examine and ascertain the cause of the trouble and make such recommendations as are necessary to remedy it. The rule of the company under which it requires bond of plumbers for proper performance of street work, is no longer enforced by the company, it having been taken out of its hands by the city. Our tappers do see that the plumber installs a service pipe in conformity with the size stated in his application. We do not permit the plumbers to make their own taps. The portion of the rule stating that the size of the tap shall be determined by the manager of the company has not been enforced, except occasionally and in an advisory manner. If it had been enforced and the company had gone farther and supervised the plumbing within the houses it would have materially affected the conditions of service. The company has a rule requiring plumbers before disconnecting, adding to or making changes in fixtures, to take out a permit for the change. As a matter of fact the plumbers usually make the change first and request the permit

after the work is done, and it is too late for the company to recommend additionally supply- facilities to provide for additional service required. We have on occasions assessed a penalty against plumbers for installing new fixtures without reporting the same and required them to pay the water rent on those fixtures from the time they were installed until thy were discovered by the company's inspectors. The rule requiring 24 hours notice in advance of making the tap is to enable the tapper to reach the place designated at the appointed time. The rule requiring "extra strong" lead service pipes is a requirement of the city of Denver.

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Redirect examination by Mr. Dorsey:

Our efforts to control the size of the service pipes began about 1902 when we found that it was common practice on the part of the plumbers to lay service pipes the same size as the taps. Such a pipe 50 feet in length will not carry the quantity of water discharged by a tap of the same size. We made demonstrations to the plumbers, showing them how much more water they could get through a tap of given size by installing a service pipe of larger diameter than the tap. The usual practice of the plumber has been to install the small service pipe because it costs less, and the efforts of the company have been to induce the plumbers to install larger service pipes. In all cases of inadequate service here complained of, installed since 1902, the size of the tap and service pipes has been adequate for the service applied for, and any inadequacy has developed either from increased demands upon the service or from defects in the plumbing. The company considers, for the purpose of its jurisdiction, that the service pipe is that part of the pipe lying in the street and extending to the house, although in cases where requests were made to enlarge old service pipes because of inadequate service we have required the enlargement to extend to the point of distribution within the cellar in order that such benefit as might be derived from enlargement of the service pipe would actually reach the fixtures. We have never considered that in the case of original installation we had any right to prescribe the plumbing to be used inside the premises. In a case such as the McGovern brothers they owned and controlled all of the pipe after it reached their premises and the company could not say what should or should not be attached to that private pipe.

Recross-examination by Mr. Stevens.

One of the rules of the company requires that air chambers be attached to the outlets or risers from the service pipe to serve as cushions against water hammer, which if not protected against would tear out the fixtures. These chambers are located inside of the premises of the consumer. I consider that all the pipe in the house is service pipe, but the plumber usually calls the risers supply pipes.

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Witness EDWARD T. LEACH.

Direct examination by Mr. Dorsey:

Is managing Editor of the Denver Express. Identifies Exhibit A-70 as an article that appeared in the Denver Express of September 29, 1914, calling for volunteer witnesses to testify to inadequate water service. States that the circulation of the Express is from 20,000 to 23,000. Objection to introduction of article, sustained.

Witness GEORGE W. SKOULAND.

Direct examination by Mr. Dorsey:

I heard the testimony of Chief Healy of the Fire Department and Mr. Chas. Allen, relating to pressure tests on the system of the D. U. W. Co. The tests made by the fire department began in the first week of June, and ended in the second last week in June. The last test I think was made June 19. Tests by Mr. Allen, on behalf of the Public Utilities Commission, began on June 16. The last test regarding which he testified was made about July 15. During the period involved in the tests the operating conditions on the system of the D. U. W. Co. were abnormal, due to the effect of breaks which occurred on two of the conduits June 4, as a result of flood. Temporary repairs were not made until June 21st, and permanent repairs were made only a few weeks ago, after the heavy load of the summer season was off the system. As a result of these breaks the carrying capacity of the conduit system was reduced below the maximum summer season demands, making it impossible to maintain normal pressure conditions in the city. This condition continued until the permanent repairs were made because with the temporary repairs the head on the conduits was reduced below the normal head, so that at no time from the date of the rupture up to the date of the permanent repairs were the conduits capable of delivering their normal supply. The result being a reduced pressure throughout the system during heavy draft.

Am familiar with the reports of the National Board of Fire Underwriters containing statistics of fire losses in various cities in the United States. Objections by Mr. Stevens to the introduc-
987 tion of comparative table of fire losses. Sustained. Master in ruling calling attention that Fire Chief Healey testified that the losses in Denver were remarkably low.

Exhibit A-71 contains tabulation of fire losses in Denver compared with other cities as set forth in the reports on those cities by the National Board of Fire Underwriters. Objection to introduction of Exhibit sustained. Exception. I heard the testimony of Mr. McGilvray and Mr. Gaffy relating to certain repairs that were being made on one of the conduits of the company last summer and from which certain pieces of staves marked defendants' exhibits 48-A 48-B 48-C were said to have been taken. The conduit referred to is conduit No. 1, constructed in 1889 and except for a short length of conduit No. 4 is the oldest conduit in the system of the company.

Conduit extends from mouth of Platte Canon to the Ashland Avenue Reservoir, something over 21 miles. The openings concerning which Messrs. Gaffy and McGilvray testified were made for the purpose of making repairs. The point designated was about a quarter of a mile north of Chatfield siding on the Colo. and Southern Ry. The pipe line parallels the public road for a long distance north of the Platte Canon works. The conduit is on the left hand side of the road at this point. The openings for repairs occurred near where the Nevada ditch crosses and re-crosses the road and where the ground is saturated with water and sour. Different characters of soil have different effects upon both the wood and bands of pipe. The public Utilities Commission Engineers in connection with their report to the Public Utilities Commission made examinations of the different conduits of the company to determine their present condition at 54 locations designated by themselves. I accompanied them on all except six of these examinations. The pipes were exposed in such a manner as to make the most complete examination possible. One of these openings was made right at the location where repairs were being made at the time that Exhibits 48-A 48-B 48-C were obtained. There were present at this inspection Mr. C. P. Allen, Mr. Van Diest, Mr. Barnes, and myself. I am not certain whether Mr. Fellows was there or not. The inspection was made Friday, Oct. 3, 1913. The soil was black, oozy, and sour and the staves were in bad condition. The condition shown there was so bad compared with the very good condition generally of all of the pipes that had been examined up to that time that I caused additional excavation to be made at 500 feet on either side of that one and still others 500 feet further on to determine how far this soil condition affected the pipe. The excavations at 500 feet on either side showed the pipe to be in much better condition but still showing some
988 effects from that soil; while the excavations at 1000 feet on either side showed the pipe to be in very good condition, about the same as the whole line, indicating that the condition first discovered was purely local. When the other holes were opened I communicated either with Mr. Van Diest or Mr. Allen, and they were examined by the Utilities Commission engineers when another inspection trip was made, so they saw the changed condition in the pipe within that comparatively short distance of 1000 feet.

Conduit No. 3, which is eleven years younger than conduit No. 1, was examined within about 1500 or 2000 feet of one of these additional openings and it would have been difficult from the appearance of this line to have determined from comparison with the additional opening on Conduit No. 1, which was the older line. The sour ground found at the first spot is the only place on the line where that character of soil occurs. No such conditions were disclosed elsewhere by the inspections made in conjunction with the Public Utilities Engineers. Generally the condition of the pipe lines was very good, showing less evidence of decay of wood and pitting of bands than we expected to find. I am familiar with the pumping station maintained at Platte Canon. It was constructed as an emergency plant to pump water, filtered by the slow sand filter plant,

to the city through the pipe line that ordinarily conveys the water from the Willard Mechanical filters to the city in order to maintain this supply in the territory served by that line in the event of a break down of the mechanical filters. The last construction work on the slow sand filter plant was done in 1906 and the pumping station was installed early in 1907. If a break down occurred at the mechanical filters and these pumping units were not installed, a considerable portion of the southerly and easterly part of Denver would be out of water during the time that repairs were being made at the filters. I am familiar with the pumping installations at the West Denver pump station and with the operation of that plant. There are three pumps normally operated by water power but equipped with steam auxiliary connections and two units operated solely by steam. The total capacity of the station is approximately 18,000,000 gallons daily. If the water power units were eliminated the capacity of the station would be 12,000,000 gallons daily. During the summer season we frequently pump 14,000,000 gallons daily from that station and during the peak load hours operate all the pumps in the station, pumping at the rate of 18,000,000 gallons. If the water driven pumps were eliminated the water service to the city would be much less efficient than it is, because we would be short during the hours of maximum draft, the 6,000,000
989 gallons which those pumps deliver into the system. These water power pumps contribute very markedly to the pressure which is maintained on the distribution system.

The D. U. W. Co. now supplies practically everyone who is available as a consumer of water, in the city. Objection by Mr. Nye to interrogation as to effect likely to be produced by a reduction in rate upon the paid consumption of water in the city. Mr. Nye and Mr. Stevens concede that no contention is made or will be made that a reduction of the schedule of rates would cause an additional consumption of water and a larger income even at the lower rates. On this understanding, objection is sustained.

Exhibit A-72 shows the amount of taxes paid by the D. U. W. Co. upon each parcel of property owned by it or the S. P. C. & R. Co. in Douglas, Jefferson, and Arapahoe counties and in the City and County of Denver, for the years 1911, 1912, 1913. The taxes for 1911 were paid on original assessments by the assessors of the several counties, and in 1912 and 1913, on assesments made by the State Tax Commission and apportioned by it to the several counties in a unit total which was distributed by the assessors of the several counties for the purpose of collection. These taxes cover only the property taxes. The several parcels in the different counties are identified by the same numbers as identify the property in Exhibit C. Objection to the introduction of Exhibit A-72 overruled. Exception.

Cross-examination by Mr. Stevens:

There is approximately 500,000 feet of wood stave pipe in the system from 2 years to 32 years old. About a mile and a half of this being 32 years old. The Utilities Commission Engineers actually

examined about 324 feet of this pipe in the 54 excavations that were made. In these excavations the pipe was examined about a mile or two apart and naturally judgment of the condition of that which was not seen was based upon the condition of that which was seen.

Pipe staves like all other wood used for construction sometimes appear perfectly sound to the eye but contain something that produces decay like it in the same structure. Sometimes the stave will decay on the outside and sometimes on the inside. Depending upon where the decay-producing medium affects the stave. When those conditions occur in a stave, that one stave fails in the pipe, causes a leak, and is replaced. And the balance of the pipe is as good as new again. Exhibits 48A, 48B, 48C, did not come from the pipes that were broken by the flood last summer. They came from a
990 point that we saw fit to repair because of the evidence of decay disclosed by the examination in conjunction with the Public Utilities Commission Engineers. One of the breaks occurred on Conduit No. 1, below Platte Canon where the river washed out 300 feet of pipe in one place and 200 feet in another. The other occurred just north of Mississippi Street where the river broke through a dike that we were building to keep out the flood and collapsed 2 sections of pipe one 30 feet and the other 50 feet long. There are four other conduits leading to the city besides the two that were broken. These conduits were capable of carrying a given quantity of water but not sufficient to supply the total demand upon the system. There is some emergency capacity in the conduits but not sufficient to meet a reduction of 25% in the total carrying capacity. All the other conduits are wooden conduits also. One has been installed 21 years, another 12, another 7, and another 4, years. We had to operate one of these remaining lines carefully while the two lines were out of service on account of the flood, because the river was over it also. The cover was washed off the line and we were afraid to crowd that while the river was running over it. That was the line that is 12 years old. We operated it up to its normal capacity but did not crowd it beyond. The other lines that were not affected by the flood, we crowded to the limit.

The emergency pumps at Platte Canon were of no use in that situation, they were installed to provide against breakdowns in the filter plant, not in the conduits. We had another break on a wood pipe conduit on the north side last fall due to the failure of one stave, as frequently occurs in wood pipe, because every once in a while a stave gets in that does not stand up as well as the remainder. It is just a question of constant maintenance as is also true of joints on cast iron pipe. My personal knowledge of the condition of the wood pipe lines is based upon the inspections regarding which I testified. But we have more detailed knowledge from a constant check on these lines. Water from the Platte Canon pumps is supplied to the east side of the city through the 34 inch conduit when those pumps are operated. We do not supply any water in Littleton except to two or three consumers along Littleton Broadway outside the limits served by the Littleton system. We supply water outside the city of Denver in Englewood, Aurora, Sheridan, Edgewater

and Mountainview. The rates charged are exactly the same as in the city of Denver, except that in the town of Aurora we charge $40 per year for the hydrants and in Denver $22.50 a year. We have no fire hydrants in any of the other towns except one in Littleton, which was installed free as a consideration for a right of way for the conduit through the town.

991 The repairs on Conduit No. 1, regarding which I testified, were north of Chatfield and not south. About the same time we installed an air valve on the hill south of Chatfield, where we had been having trouble with air pockets. We may have put in some new staves on top of that pipe when we put in the air valve, the probabilities are that the staves were in trouble as a result of those air pockets. Roughly speaking the total capacity of all the conduits in full operation is 85 million gallons daily. The average daily consumption of water in Denver for the year is about 45 million gallons and the average daily consumption during the irrigating season about 65 million gallons.

The total capacity of the four conduits that were in a working condition in June, was about 62½ or 63 millions. The actual draft on the system at the time the breaks occurred was in excess of 71 million gallons daily and had been for several days. That explains why the pressure over the system was lowered materially during the time those conduits were out of service. We were delivering about 62 millions and for nearly two weeks had been using 71 million so the reserve stored in the city reservoirs had been depleted. Permanent repairs on these conduits were completed late in the fall. General repairs were made on the system as is usual between the last of September and the 1st of the year. The water level in the city reservoirs at the time of the break was somewhere between 18 and 22 feet above the bottom of the reservoir, that is the level usually maintained.

It is not true that the wood removed at the time of the conduit breaks was burned within a day or two after it was taken out. It could not be burned. It is not true that it was all consumed before the city officials went out there to inspect the breaks, because Mr. Fellows and Mr. Anderson and somebody else representing the Public Utilities Commission found a large quantity of it at the Bean ranch house. It took us from June 4, the date of the break to about June 21st, to get the temporary repairs made. It was over a week after the break before the flood receded enough to allow us to locate the damage, then when we had the temporary repairs partly finished another flood heavier than the first came down and washed out all of the work that had been done, necessitating doing it over again. Normal conditions were not resumed on the system until the permanent repairs were made late in the fall, though normal pressure was resumed along in August or September when it began to rain and irrigation tapered off and even though we were short on capacity we maintained normal pressure. After the temporary repairs were completed it is my recollection that conduit No. 1 carried about 3½ million gallons and conduit No. 4 somewhere in the

992 neighborhood of 8 or 9 millions, making the total capacity for the system about 73 millions. The pressure was not

restored immediately because we had to gain back what we had lost in the reservoirs, also the fact that all the conduits cannot be operated all of the time up to their maximum capacity. You must take into consideration the extent to which that capacity is affected by filter cleaning operations and work of that kind.

So that while a conduit will carry a certain quantity that does not signify that you will get that quantity through it every day and every month. It would take practically 30 days to catch up the depleted reservoir supply in the city.

The extent to which pressure was reduced during the time of the break varied in different sections of the city. In some places when the reservoirs were drained there was no pressure at all. In other places the reduction varied from 15 to 25 per cent possibly. It was nowhere normal except in the two high services served by pumps where it was maintained practically at normal. In the business district it was away below normal. The West Denver Station did not get back into normal service until the permanent repairs were completed late in the fall.

Cross-examination by Mr. Nye:

I stated that an examination had been made on conduit No. 3, near the place where exhibits 48A, B and C came from, and that in that location the pipe was in first class condition. Also, that comparing the condition of conduit No. 3, at this point with the extra openings made on conduit No. 1, on either side of the bad spot in the conduit, that conduit No. 1 appeared to be in as good condition as Conduit No. 3 at the adjacent opening. The pump station at Platte Canon was completed in 1907. Commenced either early in 1907 or late in 1906. The said washer pump at the slow sand filters is installed in the same building but has nothing to do with the centrifugal pumps installed to pump filtered water. The capacity of these pumps is 16 million gallons daily and the capacity of the Willard mechanical filters about 14 million gallons.

Conduit No. 3, is the only conduit that normally carries water from the slow sand filter plant. Conduit No. 2, is connected with it through the medium of these pumps and physically it is a through conduit from the slow sand filters to Denver, though in normal operation it is divided at the Willard filters, the upper end being used as a settled water line carrying water to the filters and the lower as a filtered water line carrying water from the filters to the city. It is the upper end of No. 2, to which the Platte Canon pumps are connected. Though they also are connected to conduit No. 7
993 so it can be used to the Willard filters in case of necessity, temporarily shutting off the raw water supply to Marston Lake.

The maximum daily supply heretofore furnished the city has been nearly 73 million gallons, the maximum carrying capacity of the clear water conduits is about 85 million gallons. That is not the capacity at which it would be good practice to operate them normally. The normal capacity of the slow sand filters is about 20 million gallons. They can be operated with all of the filters in

service up to 35 million gallons. The capacity of Conduit No. 3 is about 22 million gallons. The capacity to carry water direct from these slow sand filters is limited by the direct connection of conduit No. 3 with the filters.

The pumps at Platte Canon have been used for the emergency purpose for which they were installed I believe twice, since my connection with the company. I do not know how much water they pumped daily at those times. I should say somewhere in the neighborhood of 10 million gallons, because the repair work at the Willard filters that necessitated their use was done at a time of the year when the full capacity of the plant was not required. So far as I know these are the only times when these pumps were used. They then served the purpose for which they were installed, an emergency purpose. The West Denver Pumping Station is operated to its maximum capacity every day in summer during the peak load hours. I believe the record will show that 35 per cent of all water pumped at the West Denver Station during the last ten years was pumped by the water power pumps.

The peak load is maintained usually from 6 to 8 hours a day, or from 1-3 to ¼ of the total of the 24 hour period. During those peak load hours the station will furnish from 4½ to 6 million gallons. On a good many occasions when the draft of water is unusually heavy over an entire day, as frequently occurs, it is necessary to operate the station at peak load capacity for more than 8 hours a day. I personally know of instances when it has operated constantly during the daylight hours and until 9 or ten o'clock at night, drawing down the reserve in West Denver reservoir to the extent that the output exceeded the supply. Obviously the station must be operated to its maximum capacity during a considerable number of hours in the day during the summer in order to pump from 13 to 14 million gallons daily which have frequently been pumped for many days in succession. I know that Mr. Metcalf estimated the safe yield for domestic purposes at 5.85 million gallons daily from that source, but I apprehend that he took into consideration winter conditions and frost that effect the supply from that source. We need the maximum capacity in summer when the flow of water is free and when in actual practice it has
994 been called upon and has delivered day after day, 12 and 13 million gallons. The auxiliary steam power for the water power pumps was installed within a year or two after the water power itself was installed, along in 1883 or 1884. The double source of power has been constantly maintained ever since. I have no idea what the coal consumption is per month by the turbines when they are driven by steam power. They never have been so driven except when the rest of the station is in operation. The steam power being auxiliary, its method of connection to the water power pumps is less economical than the direct use of steam on the pumps that are operated by steam only, so it is only used when greater capacity is necessary than can be furnished by the regular steam units.

The coal consumption for the water power pumps, therefore, cannot be segregated, nor can the coal consumption for any par-

ticular unit in the station be segregated. The cost of coal for the entire station can be ascertained, but not for any particular unit. Whether the coal cost for any particular month can be segregated I do not know. It is our custom to buy coal in large quantities for the station and I will have to ascertain whether it is possible to segregate it by months.

Cross-examination by Mr. Stevens:

I cannot furnish mesurements of the amount of water delivered by the D. U. W. Co. to consumers outside the city of Denver, because no such measurements are made. The only information available is the relationship between the tap area and revenue inside and outside the city limits. It is my opinion that the consumption outside the city will not exceed 1,200,000 gallons daily. I am confident that it wouldn't exceed 1½ million gallons daily. The service to these outlying towns was affected during the breaks last summer in exactly the same manner that adjoining territory in Denver furnished from the same sources of supply was affected.

Water for the irrigation of the ranches is obtained from the Platte Canon Ditch. The water company doesn't even furnish water for domestic supply on the ranches. That is furnsihed separately from the supply system of the company.

Redirect examination by Mr. Dorsey:

The various openings made for examination of the conduits designated by the engineers of the Public Utilities Commission were so located and distributed over the line as to give a fair idea of the general condition of each of these conduits. Wood stave pipe is so constructed that one stave may be taken out at any time during the life of the pipe and another stave substituted without
995 disturbing the rest of the pipe. That is one of the advantages possessed by wood stave conduits over iron or similar material. The flood of last summer was a very unusual occurrence on the Platte River. The stage of water was about 50% higher than any previously recorded stage, and the flood conditions prevailed for about 2 months. The water company had never in its history experienced trouble with its pipe lines similar to the trouble experienced last summer. The break on the conduit on the North Side to which Mr. Stevens referred was, as I understand it, a break on the extension of Conduit No. 3, which was constructed within the last two or three years, caused by the failure of one stave. I did not personally visit the location of the break. I do not remember the exact distance from Chatfield Station at which the air valve was being installed on Conduit No. 1 at the time that the other repair work was being done that was testified to by Messrs. Gaffy and McGilvary. Air valves are installed to bleed out accumulations of air on pipe lines to prevent water hammer. They are as necessary for that purpose on iron or other pipe as on wood. Though on wood pipe they serve the additional purpose of preventing the drying out of staves at the top of the pipe due to constant presence of air at a given point. It is possible that staves in the top of the pipe were

found to be defective when the air valve was installed, if so they were removed and replaced. I was there right after the installation of the air valve but do not know whether or not any staves were replaced.

The average yield of water from the Mississippi Street galleries, as shown by the tables at pages 34 and 35 Exhibit C, greatly exceed in many months the safe yield estimated by Mr. Metcalf at page 13 Exhibit C. The tables at pages 34 and 35, show that the yield during the summer season greatly exceeds the yield during the winter season.

Recross-examination by Mr. Nye:

The company is now engaged in building a new wood stave conduit, 48" in diameter, from Marston Lake to the City, which will have a capacity of 33 million gallons daily, and necessitate the construction of an additional filtration plant at the north end of Marston Lake, the initial installation of which will be about 10 million gallons to be increased up to the capacity of the line as necessary.

Recross-examination by Mr. Stevens:

There were three excavations on Conduit No. 1, concerning which Messrs. Gaffy and McGilvray testified, one of which, was for the installation of the air valve and two were for repairs.

996 Redirect examination by Mr. Dorsey:

The new conduit will be completed about May 1st. The portion that is being built now from Marston Lake to Alameda Avenue and Boulevard F, will cost about $250,000. The total cost of the line when completed to the Ashland Avenue Reservoir will be about $500,000.

The first installation of the filter plant will cost somewhere in the neighborhood of $125,000. The contract has not yet been let. By May 1, the total expenditure in connection with this work will have been from $350,000 to $375,000.

Witness THOMAS CHEYNE.

Direct examination by Mr. Dorsey:

Objection by Mr. Nye to introduction of evidence based upon results of operations for the six months period ending Oct. 31, 1914. Overruled.

Exhibit A-73, is a statement of the earnings and operating expenses of the D. U. W. Co. for the six months, May 1, to Oct. 31, 1914, under the Leaflet Schedule, with a comparison showing what the results would have been had the rate reduction ordinance been in effect. Also a comparison with the six months ending Oct. 31, 1913. The gross earnings under the leaflet schedule were $794,335.65. Had the rate reduction ordinance been in effect

the gross earnings would have been $630,872.55. The figures in red in this statement are credits or deductions from the figures appearing in black. On Oct. 31, 1914, there were uncollected delinquent licenses to the amount of $37,619.70. On Oct. 31, 1913, the uncollected delinquent licenses amounted to $6,152.55. The items under operating expenses noted B. C. D. & E. refer to extraordinary expenses incurred during the period which would have been chargeable to a depreciation or contingent reserve fund, had such a fund been in existence. To ascertain the normal operating expenses for the period I have eliminated these amounts from the operating expenses shown.

Item B covers the expense of replacement of the roof of the Ashland Avenue reservoir, necessitated by snow damage. Item C the repairs to conduits necessitated by flood damage from the South Platte River. Item D covers the expenses of the present rate litigation. Item E the expense of removal of the reservoir roofs broken by the snow. With these items deducted the net normal operating expenses are $186,134.32. I have deducted also from the gross earnings, $85,000 for depreciation and contingencies, being one-
half of the allowance of $170,000 estimated for the year
997 by the engineers for this purpose. The operating expenses for the period ending Oct. 31, 1914, are about $8500 less than actual and those for the period ending Oct. 31, 1913, about $8800 less than actual, because charges for material used during those periods are not distributed to the accounts, due to the fact that inventories are made for the fiscal year and not for the semi-annual divisions.

Information contained in Exhibit A73 is taken from the records of the company. The items, Water Licenses, and Builders Licenses, are based on receipts shown on cash book. Meter rates and Hydrant Rentals are the amounts charged during the period, though possibly not collected within the limits of the period. The figures are based on the leaflet schedule. The column setting forth the estimated reduction under the rate reducing ordinance was calculated by applying the specific reduction provided by the ordinance to the items to which it is applicable. The estimate is based upon the actual collections during the period, excluding the uncollected delinquencies. If the amounts uncollected were included the estimated reduction would be greater. The amount of the gross earnings for the period under the reduction ordinance would also be increased by an amount equal to the difference between the uncollected delinquencies and the amount of the reduction that the new rates would apply to that sum. Amounts charged as operating expenses and taxes, are obtained from the vouchers, payrolls, material reports, etc., in the company's office. In my judgment they constitute fair and proper charges for operating expenses and taxes. The gross amount charged for operating expenses for the six months ending Oct. 31, 1914, is $285,147.03, from which is deducted for extraordinary expenses the sum of $99,012.71, leaving the net operating expenses of $186,134.32. The fact that I have deducted these extraordinary expenses does not indicate that they are not proper operat-

ing expenses. They are proper operating expenses but of such a character that it would seem advisable to have the burden of them distributed over a period of years instead of falling in one year.

To the net operating expenses is added the sum of $60,089.87 for taxes paid, making a total charge for operating expenses and taxes for that six months period of $246,224.19. Exhibit A74 is a statement of the earnings and operating expenses of the D. U. W. Co. for the fiscal year ending Oct. 31, 1914, compared with the fiscal year ending Oct. 31, 1913. It is prepared from the same data and information as Exhibit A73. The same deductions from gross operating expenses are made for the extraordinary expenses as were made in Exhibit A73. The net operating expenses for the fiscal
998 year ending Oct. 31, 1914, were $358,525.84. In Exhibit A57 I estimated the operating expenses for the year ending April 30, 1915, at $333,045.06. Adding the amount of taxes for the fiscal year ending Oct. 31, 1914, to the operating expenses shown by Exhibit A74 makes the total for operating expenses and taxes for the period, $477,195.17. In Exhibit A57 the estimate for operating expenses and taxes was $453,045.06. Comparing the effect of the application of the rate reducing ordinance to the actual result for the fiscal year ending Oct. 31, 1914, with the estimate of the results for the year ending April 30, 1915, the gross revenue for water under the actual year would have been lower than was estimated in the forecast.

On the same basis, the net earnings also would be lower than indicated by the estimate in Exhibit A57.

Cross-examination by Mr. Stevens:

The data set forth in Exhibits A73 and A74 is not only correctly transcribed from the records of the company but it is checked from the original vouchers, requisitions, etc., to ascertain the accuracy of the book figures. The figures as to the effect of the application of the rate reduction ordinance were obtained by applying the 20% general reduction to the revenues of the company and then correcting for such items as were reduced more or less than 20 per cent. The corrections being applied on the basis of the number of each of the items on which the reduction varied from 20 per cent that was in use in 1913. These items being actually counted from the company's books. From this check it develops that the actual reduction provided by the ordinance, applied to the business for the six months ending Oct. 31, 1914, was 20.33%. I obtained my information concerning operating expenses and taxes from the books and vouchers of the company and some information from officers and employes. Am satisfied that the charges are correct and proper, though of course I did not actually see the men do the work for which they were paid. The amount $37,619.70 delinquent licenses uncollected Oct. 31, 1914 was an extraordinary amount, some of which has since been paid. The sum $6,152.55 carried over as delinquent Oct. 31, 1913, is about the normal amount.

The net earnings of the company for the fiscal year 1914, without deduction for depreciation, amount to $858,440.92. If there were

added to this the difference between the extraordinary and ordinary delinquencies the net earnings would be increased $31,467.15 and would amount to $889,908.07. The deductions that I have made for depreciation are based entirely upon the estimate of the engineers employed by the company. They are not based on my judgment at all.

999 The item charged as legal expenses in Exhibit A.74, is entirely separate and distinct from the item charged as expenses of rate litigation in the same exhibit under the heading "Extraordinary Expenses".

The items that were deducted from operating expenses in Exhibit A.57 were such items as in my judgment the company would not have to meet if operating under ordinary conditions, that is, they represented the best that the company could expect in the way of operating expenses. Agreement by counsel that the Master may appoint an accountant to check the items set forth in the exhibits introduced by Witness Cheyne.

Cross-examination by Mr. Nye:

The deduction of $170,000 for depreciation was made by me on the estimate of Mr. Metcalf. $140,000 of the amount is for depreciation and $30,000 for contingencies. I have made no calculation to determine the ideal conditions of a contingent reserve fund, assuming that such a fund had been provided for and maintained since the commencement of operations by the D. U. W. Co. The purpose of preparing Exhibit A.57 which is an estimate for the year ending April 30, 1915, was to have it based on a year extending from the date when the rate reduction ordinance would have been effective. I have not brought Exhibit A.57 down to date based upon the experience of the half years operation since the ordinance would have gone into effect. I see no reason why it is not proper to divide the depreciation allowance into two equal semi-annual amounts instead of pro rating according to the difference in the earnings of the company in the summer and winter seasons. There is just as much depreciation occurring in one season as in another.

If the increases and decreases under the various classifications of the company's earnings are taken into consideration, as well as the amounts earned but not collected in the fiscal year ending Oct. 31, 1914, the gross earnings of the company for 1914 are practically the same as for 1913. The increase in operating expenses under pumping expenses is due principally to the increased cost of coal amounting to approximately $3100. Also an increase in the cost of labor of $1500, and water power operation about $1500. The charges to this account are, in my judgment, proper charges. I could not say whether the increases applied to one station or to all of the stations. The increase of $11,000 in the cost of filtration is due principally to the extraordinary amount of chemicals made necessary by the muddy condition of the river. The decrease in the credit for the tap department is due to the fact that the tap department must be carried regardless of the number of taps made, and if the business is

1000 not sufficient to support the department it becomes a charge against operating expenses.

The increase in service repairs is due to increased number of repairs made by the company to consumers services which are not paid for by the consumers. Legal expenses have decreased in one branch and increased in another. The decrease in ranch revenues in 1914 is due to the fact that a considerable amount of the land was flooded, due to high water in the river.

I consider the increased cost of chemicals for filtration a proper operating charge and not an extraordinary expense charge, just as I consider the increased cost of coal in pumping a proper operating charge. I think that the only direct cost of accident or such occurrences should be considered extraordinary expenses and provided for out of contingent reserve.

In Exhibit A.57 the gross earnings for the year ending April 30, 1915, after deductions for the effect of the rate reduction ordinance, are estimated at $1,093,387.71. That would not be materially changed if the estimate were based on the business of the fiscal year ending Oct. 31, 1914, with the deduction applied and plus the earned but uncollected item of $31,000. The item "net earnings" shown in Exhibit A.57 as $640,342.65 would be comparable with the item "net earnings" without deductions for depreciation or contingencies in Exhibit A.74 plus the sum $31,467.15 of earned but uncollected rates.

Cross-examination by Mr. Stevens:

Office expenses include all items incidental to the operation of the main office of the company. The charge to the account fluctuates from year to year, partly on account of the difference in the number of inspectors employed during the irrigation season and partly because of the varying amounts charged to construction, which are determined by the extent of construction from year to year. When the construction charge is heavy a more favorable showing is made in the operating accounts than would otherwise appear. About $36,000 would be a fair average charge to filtration under present conditions, though in 1912 filtration expense amounted to $51,552.80. I am positive that no new construction is charged into the account of filter operation, not even any part of the $51,000 in 1912.

Redirect examination by Mr. Dorsey:

There are a considerable number of items under the rate reduction ordinance on which the reduction exceeds 20 per cent and a number of other items on which the reduction is less than 20 per cent. There also is a total elimination of emergency charges under both schedule rates and meter rates. On the schedule rates based on the
1001 business of the fiscal year 1914, and without consideration of the emergency charges, the net reduction by the ordinance is $4,417.24 in excess of a 20% reduction per year. The ordinance also requires that water be furnished free to the County Court House, resulting in an additional reduction of $880 per year in the estimate. I did not arrive at this estimated reduction by the application of any general percentage but by applying the reduction specifically indicated by the ordinance in each case. My judgment that the amounts charged to the operating expense were proper charges is based upon an examination of the charges themselves, and the items entering upon

the different amounts and a determination that they related to the operations of the company and not to additions to the plant. They are all shown by original vouchers and supporting papers. It is my understanding that the allotments set aside yearly as a reserve for depreciation and contingencies are theoretical contributions to a fund which is to be used with its accretions to meet these matters as they come up in the operation of the property, and not that the sum set aside each year is going to exactly equal the contingencies or unusual expenses for that particular year.

I will prepare another tabulation similar to Exhibit A.57 to show the results under the rate reduction ordinance for the year May 1, 1914, to April 30, 1915, based upon the actual results of operation from May 1, 1914, to Oct. 31, 1914, and estimated for the second six months period. Mr. Nye objects to showing what would be the result for the six months ending Oct. 31, 1914, of apportioning the depreciation allowance on the basis of the gross earnings of the company in the winter and summer seasons, declaring that that would not be a proper method of accounting. The price of coal has been higher during the fiscal year 1914 than in the previous year. I could not state whether additional labor is necessary as well as additional chemicals in connection with the filtration operations of the company because of the installation of new hypo plants.

Recross-examination by Mr. Stevens:

The charge for the Court House shown by the company's books is a flat charge of $1,100 per year, divided into two equal installments.

Re statement of the method of arriving at the actual reduction made by the rate reducing ordinance.

1002 Witness L. F. BARTELS.

Direct examination by Mr. Hodges:

Have resided in Denver since 1863, been engaged in the real estate business 29 years. Am familiar with the lands shown on Exhibit A.4 extending from the West Denver pumping plant to the Mississippi Street galleries and am interested in lands lying east of parcel 17 and west of parcel 18, south of the pumping plant and east of the canal, and with prices and sales of land adjacent thereto.

I have kept track of the more important sales in that territory for the last 20 years. Argument over the admissibility of testimony of the Witness Bartels and offer by Mr. Hodges of what he expected to prove by the witness as tending to show lack of inquiry by defendants' witness Armour C. Anderson, as to the value of the West Denver lands.

Specific objection by Mr. Nye, to testimony as to the price at which the Bartel's estate sold certain lands in West Denver to the D. U. W. Co. on the ground that the question involved is a question of value and not a question of the price at which the land was sold.

Master rules that the Bartels testimony may be admitted. Not on the ground that it is proper rebuttal testimony but on the broad ground that it may be helpful to the case.

Am familiar with the lands included in item 25, West Denver

pump station lands, and with the adjoining lands owned by Holme and Allen, which are listed with me for sale. About two years ago they were willing to sell the lands at $8,000 an acre. Motion to strike denied. Exception. Within the past 90 days they raised their price to $10,000 an acre. They own between three and four acres. Am familiar with the lands in item No. 27, the Lake Archer and Mississippi street gallery lands. 10 or 11 years ago the D. U. W. Co. purchased parcel 18 from the Bartels' estate. It contains one acre and the price paid by the company was $3,000. Have recently negotiated for the sale of our land lying west of there at $3,500 per acre and east of there at $5,000 per acre. Parcels 20-23 were sold to the Water company by Asa Middaugh and the Del Norte Company of which he was president, for $5,000 per acre. Have had negotiations within the past year for property lying adjacent to parcel No. 24, Item 27, in what is known as Bailey's addition. The owner is Phillip A. Ryan. He asked me $250 a lot for 200 lots. With the streets platted, we figure 10 lots to the acre. 4 acres of land adjoining parcel No. 25 were sold within the last two years by the Western Chemical Company at $1,000 per acre. I sold part of Block 2, Rich-
1003 tofens Addition to Lake Archer, part of it to Sylvester A. Snyder and part of it to the Colorado and Southern R. R.

6 lots were sold to Snyder at $150 or at the rate of $1,500 an acre, and 4 lots at $200 at the rate of $2,000 an acre. I sold a fraction of 3 lots to the Colorado and Southern Railroad at the rate of $200 a lot. The Colorado and Southern sale was made in the fall of 1913, the Snyder sale in the spring of 1914. Objection to testimony concerning the Jason St. and Alameda Avenue condemnation proceedings sustained. Exception. Have negotiated with a party named Eastman for the sale of his land on West Alameda Avenue a little east of Parcel No. 27, Item 27 for which he asks $4,000 an acre. In Oct. 1912, I sold a tract of about 3 acres adjacent to parcel 30, item 27 to the Sutton, Steele and Steele Co. at the rate of $2,000 an acre. Also obtained for that company from the Colorado and Southern Railroad a strip of land 30 feet wide by 293 feet long to give it an outlet to Jason Street, for which I paid 32½c a square foot or at the rate of $14,000 an acre.

In February, 1913, I sold 8 lots in Block 42, Byers' Subdivision, to the Sundquist Lumber Company at $400 a lot, approximately $4,000 an acre. About 8 years ago I sold Block 5 Manchester, which lies south and west of Parcel 33, containing 5 acres, for $3,500.

Cross-examination by Mr. Nye:

The Holme and Allen tract lies just east of the West Denver pump station. There is no street between the pump station and the lands. The street runs to the line of Parcel 16 of the D. U. W. Co., but does not reach the Holme and Allen land at all. The land of the Water company adjoining the Holme and Allen land is used for storing water and a pump station site. I consider the Holme and Allen land worth $5,000 an acre the same as our land that adjoins it and consider that the water company's land adjoining it, is equally as valuable and saleable. Parcel No. 17 is used by the water company as a right of way for the canal connecting Lake Archer with the pump-

ing plant. If abandoned for that purpose it is as valuable as our land, except for the cost of leveling the canal excavation. West 8th Ave. crosses that strip at the south end. It would be valuable for trackage and manufacturing property. The Denver and Rio Grande Railroad is on the east and the Santa Fe on the west. Rights of way would have to be obtained through other property for outlets to the railroad. Parcel 18, which we sold to the water company is a strip of land 35 feet wide along the canal, containing 1 acre, which is used for a pipe line. It is valuable to the company for that purpose. I do not think they paid a very good price for it, in fact Mr.
1004 Middaugh objected a good deal because we would not raise our price to $5,000 an acre. We did not sell our lands east of the canal, which were negotiated at $5,000 an acre, because the party also wanted the Holme and Allen land but would not pay their price for it. In the case of the land west of the canal we were offered $3,500 an acre for 5 acres, but would not sell unless they would take the whole sixteen acres. Parcels 21-23 lie almost entirely in Lake Archer. I do not regard them as valuable as land immediately east, but they are as good as the land lying west. The bulk of it is higher than the land lying west of it. The Colorado and Southern Railroad track lies across the street from the land I sold to Sylvester A. Snyder, and Snyder after purchasing the land obtained a permit to get a spur track onto his ground that he uses for a coal yard. Parcel 25 is a portion of a 25 acre tract. It varies considerably in width. The Colorado and Southern right of way extends through it and part of it is in the river bed.

The portion lying in the river bed is valuable for gravel land and the gravel can be taken right up to the Colorado and Southern right of way. I would consider the land in parcel No. 25, worth about half as much as the land adjoining the Western Chemical Company about which I testified. The land that I sold the Colorado and Southern Railroad out of Block 2, Richtofen's addition, was sold prior to the sale of the other lots in the same block which were sold to Sylvester A. Snyder. The Colorado and Southern wanted the land to straighten out a crossing. The Eastman tract along Alameda Avenue is trackage property. It has no opening to Alameda Avenue because the wall of the subway shuts it off. Access to it is from Jason St. The land that I sold to the Sutton, Steele and Steele Co. immediately adjoins the south-east corner of parcel No. 30. The sale was made to W. S. Myers, President to the Company. Before he made the purchase I showed him a number of other sites in the vicinity, but this one evidently suited his purpose best for he bought it. Afterwards I purchased from the Colorado and Southern Railroad the strip to give him an outlet to Jason St. I considered the price of that strip exorbitant but it has been my experience that when someone has a reason to believe that you need a strip like that they get a better price for it than they do ordinarily. The land sold to the Sundquist Lumber Company is on Cherokee Street, about 2,000 feet from Broadway. There is no track on it. The nearest tracks are the Santa Fe tracks across Cherokee St. That sold at the rate of about $4,000 an acre for platted ground. I consider parcel No. 30 worth about ½ as much as that.

1005 The land that I sold south and west of Parcel No. 33, is used for truck garden purposes. Parcel No. 33 is not available for that purpose, nor is parcel 34 adjoining it. The Platte River runs along close to the east side of parcel No. 33.

Cross-examination by Mr. Stevens:

I would not accept as a measure of value of property an award by an arbitration board in a condemnation proceeding without knowing who constituted the board. It is my understanding that when Mr. Middaugh sold the three triangular strips to the water company he also sold them the narrow strip, colored in red, with the rest of those parcels. At least he fixed the price on all of them at the same time.

Redirect examination by Mr. Hodges:

(Comparisonof relative utility of D. U. W. Co. lands with adjoining lands.) The pumping station lands are all trackage property. The Colorado and Southern tracks running along the west line. Tract No. 24 has similar access to the Colorado and Southern and Santa Fe tracks. Tract 28 is not trackage property but can be made so at small expense. The Colorado and Southern has spur tracks on the ground adjacent to it. Parcel No. 30 is trackage from the fact that the Colorado and Southern Railroad has spurs running across the land to the Sutton, Steele and Steele Company's tract and also a track on the ground leading to the old Colorado Zinc plant. Parcel 31 is not trackage but could be made so by connecting with the Colorado and Southern, South Park branch, about 300 feet to the south. Tracts 32 and 33 are not trackage. Tracts 17 and 18 if the canal was abandoned could be leveled to the same level as our land to the east, which we hold at $5,000 an acre, and would be higher than the land to the west. Tracts 20 to 23, comprising Lake Archer, could not be filled except at great expense but it is higher than the ground to the west and not as high as the ground to the east. Tracts 24, 25, and 26, are gravel lands the same as the land that the Western Chemical Company is using for that purpose at the present time. Part of tract 27 is also in the river bed and useful as gravel land. The balance of it and tract 28 is good soil and treated as Valverde lots.

Parcel No. 30 is the same character of land as that of the Sutton, Steele and Steele Manufacturing Company but not quite so high. Part of parcel 31, is on the same level as the truck garden and lying west of it, part of it is timbered and has gravel deposits on it. It is not as good gravel land as some of the other parcels. Parcel No. 33, lying south of Mississippi Street is also gravel land.

1006 It would not be desirable to have the lands in the neighborhood of the pumping station platted. They are more effectively controlled for manufacturing purposes without having streets cut through them.

There is a railroad grade constructed across the land to the east of parcels 30 and 31.

TRANSCRIPT OF RECORD.

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, [redacted] 1917

No. [redacted] 294

CITY AND COUNTY OF DENVER ET AL., APPELLANTS,

vs.

THE DENVER UNION WATER COMPANY.

No. [redacted] 295

THE DENVER UNION WATER COMPANY, APPELLANT,

vs.

CITY AND COUNTY OF DENVER, ET AL.

APPEALS FROM THE DISTRICT COURT OF THE UNITED STATES FOR THE DISTRICT OF COLORADO.

FILED OCTOBER 24, 1918.

(25,566)

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INDEX TO VOL. III.

(25,566)

(25,567)

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, 1916.

No. 736.

CITY AND COUNTY OF DENVER ET AL., APPELLANTS,

vs.

THE DENVER UNION WATER COMPANY.

No. 737.

THE DENVER UNION WATER COMPANY, APPELLANT,

vs.

CITY AND COUNTY OF DENVER ET AL.

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Recross-examination by Mr. Nye:

The river channel runs through Parcel No. 28 and cuts the southwest corner of parcel No. 30.

Witness ARTHUR D. WALL.

Direct examination by Mr. Dorsey:

Exhibit A 75 is a tabular comparison of the valuations fixed upon the lands of the D. U. W. Co. by the several witnesses representing the company and the city, who have testified as to land values, with computations showing the difference between the valuations fixed by witnesses on behalf of the company and witnesses on behalf of the city. The compilation is made from the figures already part of the record in this case, as a result of testimony given, or exhibits introduced by the several witnesses. The land values found by the Public Utilities Commission engineers are approximately $340,000 less than the values given by Metcalf & Anderson in Exhibit C. The stars opposite certain figures in the different columns refer to foot notes at the bottom of pages and particularly to instances where valuations of several parcels are grouped by some of the appraisers. Parcel No. 15, Arapahoe, known as the Woodbury land, is not valued twice. Its valuation is shown at page 113, where it is designated as the Woodbury land. It is not valued in connection with the 40 inch conduit lands at page 115. The valuation given by Messrs. Metcalf and Anderson for the conduit rights of way, owned in fee by the D. U. W. Co., is $22,028, as enumerated under items 34, 35, 36, except parcel 15, of Arapahoe County. Practically all of item 34 was purchased by the water company in 1901, and items 35 and 36, were purchased in the past 4 or 5 years. The actual purchase price paid by the company for these various items was $19,116.55. There has been a marked increase in the market value of land since the purchase in 1901, but not since the purchases in the last 4 or 5 years.

In making this compilation of comparative valuations, I discovered that many rights of way within the City and County of Denver had been omitted from the list in item No. 37 valued by Mr.
1007 Bowles and myself as rights of way for conduit lines. Objection sustained to testimony as to these omissions tending to show that contingencies developed even in estimating the duplication cost of an established plant. Exception.

During the past 20 years I have had experience in operating and leasing farms, in this neighborhood. I am familiar with the system of operation of the farms owned by the D. U. W. Co. They are operated under a foreman who employs all labor necessary, and are supplied with such water as is not needed by the company for the city of Denver. Under this system the operation is less profitable than if the farms had a full water supply so they could be leased to good tenants on shares.

The result of the company's farming operations has been more satisfactory since the Harriman Ranch was sold, because it was al-

ways operated at a loss. In valuing these ranches Mr. Bowles and myself did not value them as ranches with adequate water rights. When Mr. J. I. Carper, a witness on behalf of the defendants, testified concerning a uniform valuation of $5 per acre for grazing land and stated that he had purchased such land at that price east of Denver, in a transaction with me, he referred to a parcel of 150 acres which was part of a 4,600 acre deal and which was listed in a deferred payment contract at a price of $750. The contract price for the 4,600 acres was $276,000. A down payment of $50,000 was made and prices were fixed, upon the various tracts comprising the whole, at which these tracts would be deeded as they were sold by the purchaser. That is how the price of $750 was attached to this 150 acres. Mr. Carper's company sold the 150 acres for $10 an acre. I do not think it could really be said that he purchased that particular tract for $5 an acre. About ¼ of the 4,600 acres was dry land.

Cross-examination by Mr. Stevens:

I do not know how much water is used for irrigation on the farms owned by the company. Whenever there is a shortage of water it is taken from the farms. The management of the water company is the judge as to the necessity for taking the water from the farms and using it for the city. My understanding is that the farms are kept for the protection of the water rights. There are many times when all of the water purchased with the farms is taken for domestic purposes. There may be times when it would all be used on the farms, but that would not occur so frequently because the periods of shortage exceed the periods of plenty, during the irrigation season. I do not know that I have seen crop failures on these ranches, but I have seen crop shortages, particularly in 1902.

1902 was an exceptional year from the view point of water shortage.

Cross-examination by Mr. Nye:

1008 The net difference in valuation of lands between Metcalf & Anderson and the Public Utilities Engineers was $341,038. The principal difference occurs on six items. On certain other items the valuation fixed by the Public Utilities Commission engineers was higher than the valuation fixed by Metcalf and Anderson. I obtained the price paid for the conduit lines, $19,116.55 from the consideration stated in the various deeds and from the records of the company. I had nothing to do with the acquisition of these lands by the company. About two-thirds of these conduit lands were purchased in 1901. I think it is generally true that the market value of these lands has practically doubled since that time. I do not think it is true that the Platte Valley ranches of the water company are regarded as the best irrigated and most productive farms in the neighborhood. There are many other farms where the gross and net revenues are greater in that immediate vicinity. Off hand I would mention the Patterson farm, the Skelton farm, and the farm formerly owned by Peter Magnus, as examples.

Redirect examination by Mr. Dorsey:

The price paid by the water company for the approximately ⅔ of the conduit land acreage, purchased in 1901, was practically $12,000.

Witness ARTHUR D. WALL, recalled.

Direct examination by Mr. Dorsey:

Have been in active charge of one or more irrigation systems on the South Platte River for about 20 years. Have owned or represented stock in many other irrigation companies. Have been connected with and been an officer in The Consolidated Ditches Company, of Water District No. 2, for about 10 years, was secretary for several years of a state organization known as The Colorado Irrigators' Association. Have been interested in litigation affecting ditches, reservoirs, and water rights, and am familiar with stream flows and the operation of ditches and reservoirs. From inspection am familiar with the structures of all of the ditches in Districts No. 8 and No. 2, and with the character of land under most of them and with every reservoir or reservoir site upon which a filing has been made, on the Platte River, either above or below Denver. I had active charge of the High Line Ditch for 12 or 13 years, and was secretary of The Antero and Lost Park Reservoir Company
1009 from 1907 to 1914. This connection was during the period of construction of the works of this company. Am still a stockholder and director, of this company. The Antero Reservoir is located on the South fork of the South Platte River about 65 or 70 miles above Lake Cheesman, and derives its water supply from the same source that in part supplies Lake Cheesman. The High Line ditch and the Antero Reservoir are owned by the same company. Records have been kept that make it possible to ascertain how much water has been stored by the Antero Reservoir.

In the year 1909 there was stored in the Antero Reservoir a total of 12,000 acre feet; in 1910, 3500 acre feet; in 1911, 11,000 acre feet; in 1912, 29,000 acre feet; in 1913, 10,000 acre feet. Making a total storage from 1909 to 1913 inclusive, of 65,500 acre feet. The decree of Antero reservoir is subsequent to Lake Cheesman. The water commissioner for District No. 8, 1913, was a new man inexperienced in the work. I have examined the field book of the water commissioner for District No. 8, for the year 1913, this book is supposed to contain a daily or at least a frequent record of the diversions by the various ditches in the district but contains no such records for the Nevada, or Last Chance ditches, or for some other small ditches in the district. In the portion of the book provided for a recapitulation of the year's operations of the district, the book contains statements of the date when the ditches began to use water and when they shut down, the total number of days for which water was carried, and a statement that in the case of the Nevada ditch it carried 55 second feet for every day it was in operation, and the Last Chance, 28 second feet for every day it was in operation. This field book is supposed to be carried by the water commissioner

and the information is supposed to be noted when he visits the ditches.

It is the custom in the operation of the Nevada and Last Chance ditches to take at the headgates practically all of the water that their decree entitles them to take and then return to the stream through waste gates and tail ditches so much of this water as is not immediately required for irrigation of the lands under the ditches. This is generally true of all of the ditches in the district, more particularly of these two, because they don't get very far away from the river. The same conditions apply to the ditches in District No. 2, and particularly in the cases of the Brantner and Brighton ditches, which are particularly well equipped with waste gates where they cross Big Dry creek; in the case of the Brantner, 8 or 9 miles from the headgates, and in the case of the Brighton, 6 or 7 miles from the headgates. Both of these ditches have old priorities and their practice is to divert a good volume at the head gates
1010 and regulate the supply at Big Dry creek. For some years I operated the Lupton Bottom Ditch which occupies the channel of Big Dry creek for about a mile below the waste gates of the Brantner and Brighton ditches, there were often periods for 2 or 3 weeks when we derived our entire supply of water from Big Dry creek and most of it was waste water from the Brantner and Brighton Ditches. During these periods we did not draw a drop of water from the headquarters of the Platte River. We obtained approximately 50 second feet of water from the waste from these two ditches. Most of the other ditches in District No. 2 operate in a similar manner. Water that is diverted in that manner and returned to the stream through waste ways and tail ditches is immediately available for diversion by ditches lower down.

Any water diverted by the Nevada and Last Chance ditches in this manner and returned to the stream, that was not taken by ditches in District No. 8, would be available for ditches in district No. 2. I do not believe that there will in the future be any material increase in the quantity of water diverted by the ditches in these districts. Exhibit A.76. is a sectional map of Northeastern Colorado published by Williamson & Haffner, copyrighted in 1910, which shows the lands irrigated and irrigable under the ditches in these districts. There are something like 24,000 acres under cultivation under the High Line Ditch and about 110,000 acres irrigable from its ditches and laterals now constructed. It diverts about 40,000 acre feet per annum or 1¾ acre feet per acre, water being taken usually in the early part of the season. In my opinion there is no possibility of any material increase in the acreage irrigated under its present rights. That acreage has remained practically stationary for 15 or 20 years, except for a slight increase in recent years due to a reservoir supply having been added to its direct flow rights. Should this reservoir supply be increased there is little likelihood of an increased demand from the direct flow rights.

Experience indicates that an ample reservoir supply available for delivery late in the season may increase the acreage without increasing the demands from the direct flow rights that are available

for use only early in the season. As a matter of fact, such a supply is more likely to decrease the demand from the direct flow rights because a farmer operating under a flood water ditch whose supply is available only in the early part of the season will probably take all the water available then, whereas, if he has a suppplemental reservoir supply available later in the season he will take only what he needs. This is demonstrated in district No. 3. on the Cache La Poudre river where the acreage irrigated 25 years ago was about
125,000 to 135,000. There are now irrigated in the district
1011 about 245,000 acres and the Poudre river carries no more
water now, than it did 25 years ago. The additional acreage is made possible by irrigation from stored water and by the increased seepage and return flow developed from the application of that water.

The Last Chance Ditch which is next below the High Line now irrigates all of the land capable of being irrigated under it. That is also true of the Nevada ditch which extends three or four miles farther down the river than the Last Chance. All of the land under it is cultivated and there is no feasible way of extending it. The City Ditch now irrigates all the land that can be irrigated under it between its headgate and the park lakes in the City of Denver, and in my opinion there is no possibility of the ditch ever being extended beyond the City Park lakes. The same conditions are true of all of the smaller ditches in District No. 8. which irrigate small areas practically in the river bottoms. The Platte Canon Ditch owned by the water company now diverts the full amount of its decree and its demands cannot be extended. The same conditions are generally true in District No. 2. The Brantner ditch has its headgates 11 or 12 miles below the city of Denver and irrigates perhaps 5,000 acres of land west of the river. It ends in rough country now supplied by ditches from Clear Creek or Boulder Creek. The Brighton ditch irrigates probably 2500 acres under similar conditions. The Lupton Bottom Ditch irrigates a narrow strip of land along the west side of the river and it terminates where the ditches from Boulder creek supply the land. There are several smaller ditches on the west side of the river similarly situated. On the east side of the river the Burlington Ditch is situated very much like the High Line Ditch. There are about 20,000 acres irrigated under it and the area cannot be increased with the direct supply. They are supplementing the supply by reservoir water which will develop the same conditions as described under the High Line and make no increased demands upon the river from the direct flow rights. The Fulton ditch, the next one on the east side of the river, is in exactly the same situation. The land under it is in the river bottom, and while there is some uncultivated land at the lower end of the ditch, the area cannot be increased except by a supplemental reservoir supply which will develop the same conditions as under the High Line and the Burlington. The Platteville, the next ditch, irrigates a small area in the river bottom and all available land is irrigated. The next ditch, the Platte Valley Ditch or Evans No. 2., now irrigates all the land that it can irrigate because its works terminate at

a ridge between the Beebee draw and Box Elder creek. The land on the other side of which cannot be feasibly reached.

1012 The same is true of the Buckers, Farmers Independent, the Western, or Hews and Cook Ditch, The Union and the Godfrey Ditches, all of which have their final limit at this ridge. All of the land under these ditches is now irrigated. The Lower Latham Ditch passes around the north end of this ridge and could be extended, but as a matter of fact the area under it is ample to use its full water supply, and it is all in cultivation. It is my opinion that there will be, or can be, little, if any, enlarged use of water during the irrigation season by any of the ditches in Districts No. 2 and 8, which have priorities earlier than Lake Cheesman, under their existing decrees. I am familiar with adjudicated rights and rights in process of adjudication following the decreed rights of Lake Cheesman. (By Mr. Dorsey, "Such rights as have a bearing upon the claims made by Mr. Fields, and Mr. Fellows, as to a water supply available for the Bates reservoir after the rights of Lake Cheesman and all other rights were satisfied.") Information as to these rights is obtained either from the decrees entered by the courts, where decrees have been entered, or from proceedings pending in the courts, where decrees have not been entered.

In District No. 23, there are three reservoir decrees subsequent to Lake Cheesman and prior in time to July 3, 1910, for 207,550 acre feet, excluding a number of small reservoirs, the rights of which are for purposes other than irrigation. All of these reservoirs, except one, the Geneva creek reservoir, with a decree for 1,500 second feet, are on the south fork of the South Platte or its tributaries above Lake Cheesman. Four of them aggregating 135,980 acre feet are constructed. The others are in process of construction. Those under construction are given conditional decrees. Objected to unless decree is produced.

I am personally acquainted with these reservoirs and have inspected them. There are no reservoirs of any consequence in District No. 8. The reservoirs in District No. 2, are now having their claims adjudicated but the decree has not yet been entered. The aggregate of the claims in process of adjudication in District No. 2, is 94,807 acre feet. As secretary of The Consolidated Ditches Company of District No. 2, I am familiar with this proceeding. Objections have been filed as to the dates of priority of some of these reservoirs but there have been no objections filed as to their capacities. In addition to the reservoir claims adjudicated and in the process of adjudication, there are a large number of ditches in Districts No. 3 and No. 2, subsequent in time to Lake Cheesman whose claims are involved in the same proceeding. I have made no effort to investigate the statute in this respect in ditches tributary to District No. 2 and No. 8. Many of these claims that are

1013 subsequent to Lake Cheesman are prior in point of time to April, 1908, and to July, 1910. In Districts No. 1 and 64, lying below District No. 2 on the South Platte River, there are reservoir claims aggregating, I should say, 300,000 acre feet subse-

quent in point of time to Lake Cheesman and prior to April, 1908, or July, 1910.

Direct flow rights are not at all comparable with stored rights. Water supply under direct flow rights is limited by the extent of the decree and the capacity of the stream to supply water to that decree, and at no time can draft be made in excess of the amount decreed. A reservoir supply may be delivered in any volume and at any time desired by the owner of the rights. It is customary to value direct flow rights on the basis of cubic feet per second or statutory inches, units of measurements of flowing water, and stored rights by cubic feet or acre feet, units of measure of water that is not in motion. As an example of the difference in value between direct flow rights and stored rights, take the High Line Ditch under which the direct flow diversions represent a value of about $15 per acre foot, the Antero reservoir delivering water through part of the same system sells storage rights on the basis of the total capacity of the reservoir, 85,000 acre feet, at $30 to $35 per acre foot.

(Comments on testimony of Messrs. Taylor and Patten, witnesses for the defendants in regard to certain ditches in District No. 2, and the value of stock or water rights under said ditches.) As to the Brantner ditch, there are 300 shares of stock in the company, the holders of which are entitled to their pro rata share of the water subject to the prior right of nine farms owned by the original builders of the ditch to about 18 second feet of water.

There is a sort of general understanding that the value of the stock is $300 a share, though I do not believe that one share of stock could be bought apart from land. The testimony of Messrs. Taylor and Patten would indicate that the whole Brantner ditch and its water rights could be bought in that way for $90,000. It would not be possible to purchase the Brantner ditch and its water rights without buying the farms under it.

Objection overruled. Exception.

Messrs. Taylor and Patten also referred to the Brighton Ditch. I never have heard of the sale of Brighton Ditch stock apart from land. It is a close corporation. All of these ditches in District No. 2 are members of The Consolidated Ditches Company of which I am secretary. Messrs. Taylor and Patten also referred to the Fulton ditch which irrigated about 11,000 acres and has outstanding 7,200 shares of stock, each representing about 1½ acres. A small quantity of this stock is from time to time handled on the market at from $75
1014 to $90 per share subject to the indebtedness of the company which adds about $9 per share. This ditch unlike the Brantner and Brighton, does not have enough water for its needs. I have either owned or represented stock in the ditch for many years.

The ditch is and for many years has been seeking a supplemental reservoir supply to take care of its needs during the critical crop growing season. Messrs. Taylor and Patten also referred to the Farmers Independent ditch which irrigates about 9,000 acres and has outstanding about 800 shares of stock. A small quantity of that stock is handled from time to time on the market at about $300 a share. But like the Fulton, its water supply in the latter part of the season

is insufficient, being limited to its first decree which yields approximately 3 statutory inches of water. The Farmers Independent has doubled the acreage under cultivation during the last few years, but it has not increased its diversion of water.

Objection sustained to interrogation as to whether these ditches and their water rights could be purchased in their entirety at the rate of the prices per share quoted by Messrs. Taylor and Patten. Exception.

No considerable number of shares could be purchaased in any of the companies at the prices stated by Messrs. Taylor and Patten. Messrs. Taylor and Patten also referred to the Farmers High Line Canal, in District No. 7, supplied from Clear Creek.

I have owned or had charge of land under the system and owned or represented stock in the company. The system irrigates about 30,000 acres of land. There are outstanding approximately 1,000 shares of stock. The company has an outstanding indebtedness of about $60,000. The stockholders do not participate in all of the water diverted by the ditch. There are in the ditch what are called schedule rights for 825 statutory inches or 22 or 23 second feet that must first be supplied. There are also what are known as statutory rights for 800 inches, approximately 21 second feet, which pro rate with the stockholders. There are two small reservoirs connected with the system, the Broad reservoir with a capacity of something like 1,800 acre feet and the Leyden reservoir with a capacity of approximately 1,500 acre feet. The ditch diverts an average of 40,000 acre feet a year or about 1¼ acre feet per acre for the 30,000 acres. That includes the water diverted to the two reservoirs. The diversions are made principally in the early part of the season. After about July 10, the ditch has available only about 46 second feet under its early appropriation.

The Farmers under this system have constructed about 200 private reservoirs, in which they store the water received on the direct
1015 flow rights until they need it. No considerable number of shares of the stock of the Farmers High Line Canal and Reservoir Company could be purchased at the price indicated by Messrs. Taylor and Patten as the market price. Very little of the stock is on the market. The lands in the lower part of the district irrigated by the Farmers High Line adjoin the upper part of the lands irrigated by the Brantner ditch. The fact that Messrs. Taylor and Patten place a much higher market value on the water rights under the Farmers High Line than on the rights under the Brantner ditch is explained by the law of supply and demand. There is no demand whatever for stock under the Brantner ditch and little, if any, is ever sold except in connection with lands, because there is no land unirrigated to which the water can be applied. Under the Farmers High Line there is a limited area not yet cultivated and its stock is frequently handled on the market separate and apart from the land in small quantities. The Antero Reservoir in 1913 supplied approximately 24,000 acre feet of stored water through the High Line Ditch, of which somewhere between 21,000 and 22,000 acre feet were actually diverted by the ditch after deductions were made for loss in

transit under the rules of the state engineer's office. I am familiar with the J. Thomas Ditch in District No. 2. In a recent abandonment proceedings its decree was reduced from 104 and a fraction second feet to 18 second feet. The abandonment decree reciting that only a fraction over 11 second feet had ever been applied to beneficial use. The ditch irrigates a triangular shaped tract of land at the junction of the St. Vrain and the South Platte river.

The Union ditch in District No. 2 in addition to diverting water for direct irrigation during the irrigating season also diverts storage water for the Lower Latham reservoir. The Evans Ditch No. 2 in District No. 2 in addition to diverting water for direct irrigation during the irrigating season also diverts storage water for the reservoir known as Milton Lake. The Burlington ditch in District No. 2 in addition to diverting water for direct irrigation during the irrigation season also diverts water for storage in a number of reservoirs, among them, Barr Lake and Horse Creek reservoirs and to a number of smaller reservoirs, the aggregate capacity of all of them being about 75,000 acre feet. There is no storage under the Section No. 3 or Godfrey ditch. In District Nos. 2 and 8 the water commissioner makes his determination of the quantity of water diverted by the ditches from measurements at the headgates of the ditches. These measurements are above the waste gates from which water is returned to the stream. I am acquainted with the ditches and irrigation systems in District No. 3 referred to Messrs. Taylor and Patten,
1016 in their testimony. The irrigable area of District No. 3 extends from Fort Collins and Wellington on the West to Greeley, Eaton and Ault on the east. The district being widest at the eastern end. The center of the district is almost directly north of Denver. The first ditch referred to by Messrs. Taylor and Patten, is the Larimer and Weld Canal. I was employed for a number of years by the company that constructed this system. My employment commencing about the time the water rights were sold and the canal turned over to the purshasers of the rights. It diverts water from the Poudre river about 2 miles above Fort Collins. Irrigates about 50,000 acres of land. Its main canal is about 50 miles long. Its principal appropriation is No. 88 in the district, of September, 1878, for 571 second feet. It has an old priority of about 20 second feet. There are 376 shares of stock outstanding.

All of the users of water under the system are also owners of reservoir water for supplemental supply. Originally the shares were for the irrigation of 80 acres, being now supplemented by reservoir water. About one-half of the owners use one share for 160 acres. The supplemental supply for the stockholders is obtained from six different reservoir systems. The ditch company charging the owners for the carriage of this water. The average annual diversion under the direct flow rights is from 25,000 to 30,000 acre-feet and the supply from storage about the same. Making the total supply a little over an acre foot per acre.

The reservoir water is run only to owners of rights in the ditch. The combined market value of the ditch and reservoir rights is approximately $50 per acre foot. The next system referred to by

Messrs. Taylor and Patten, is the Larimer County canal, owned by The Water Supply and Storage Company. It irrigates about 45,000 acres. There are 600 shares of stock outstanding. Water is diverted from the Poudre river about 10 miles above Fort Collins, and the main canal is about 71 miles long. The shares were originally issued to supply 40 acres. The rights of this ditch are practically the last on the river. Priority No. 100, April 25, 1881, for 463 second feet. The company also owns 9 storage reservoirs with a combined capacity of approximately 23,000 acre feet. In connection with the stored water, the original shares are now used for the irrigation of about 80 acres, instead of for 40 acres. The average annual diversion is from 40,000 to 50,000 acre feet, or practically one acre foot per acre. About half is supplied by direct flow rights early in the season and about half from storage rights.

The market value of the stock is about $50 per acre foot. There is practically no stock of either of these companies on the
1017 market. The reservoir water under these systems is worth at least double the direct flow water. Making the acre foot value of the reservoir water, in round numbers $65. The next system referred to by Messrs. Taylor and Patten is the Larimer County No. 2, diverting water from the Poudre river about 6 miles above Fort Collins. It irrigates about 7,000 acres. Its priority is No. 57, April 1, 1873, for 175 second feet. Water generally is available under its rights up to about July 4th. The ditch extends to Fossil creek, and there is no feasible way of increasing the acreage under it. (This is also true of the Larimer and Weld and the Larimer County systems.) The ditch company owns no reservoirs, but the farmers under it, almost without exception, use reservoir water from Warren Lake or from the North Poudre irrigation system, to supplement the supply. Stored water from Warren Lake is valued at about $70 per acre foot.

The market price of the stored water from the North Poudre system is about $60 per acre foot. There is practically no stock of the Larimer County No. 2 ditch on the market.

The next system referred to by Messrs. Taylor and Patten was the Hillsboro system. Ditch diverts water from the Big Thompson river about 4 miles east of Loveland. Ditch is about 12 miles long, irrigates about 9,000 acres, which acreage cannot be increased. The ditch has two priorities, one dated April 15, 1878, for 99.46 second feet, the second Oct. 6, 1881, for 45.69 second feet. It has also purchased part of the priority of the Big Thompson ditch, which is Number 1 on the river, and furnishes a small volume of water during the whole season. There are 118 shares of stock outstanding and the secretary of the company knows of only two sales of stock separate from land in 20 years. One sale of one share in connection with the settlement of an estate, and another sale of one-half a share.

The next system referred to by Messrs. Taylor and Patten, was the Home Supply Ditch, which practically parallels the Hillsboro on higher ground. It diverts water from the Big Thompson river about 9 miles above Loveland. It is about 25 miles long, irrigates about 20,000 acres, its priority is practically the last on the Big Thompson

river, July 15, 1881, for 278 second feet. It also has contracts, with the Big Thompson ditch and the Big Thompson No. 2, from which it derives a little water up to July 15th. It also owns two reservoirs with a combined capacity of approximately 13,000 acre feet. There are 2,000 shares of stock in that company, under which the owners of rights receive about 11 acre feet per annum per share. About 6 feet from storage and 5 feet from direct flow. The value of the combined supply is about $45 per acre foot. And the value of the
1018 stored water alone about $60 per acre foot. The stored water being worth twice as much as the direct flow water. Am acquainted with the properties of The Denver Reservoir and Irrigation Company, concerning which Messrs. Taylor and Medina, gave testimony. At the time it started to sell water rights, it owned comparatively little property, practically only the site of the Standley Lake Reservoir.

The company proposed to construct a large number of ditches and reservoirs and acquired by purchase some direct flow rights. Its supply was to be combined storage and direct flow, more than half of it being from storage. The rights offered for sale consisted of stock in the company owning the irrigation works. Its construction work proceeded quite rapidly for a time, but the entire system is not yet complete. Portions of it are complete. Their final plans were for the construction of a system with a capacity of 210,000 acre feet, combined storage and direct rights. At the time that Mr. Medina testified, he was engaged in selling stock. The company had just started its operations. Only a small amount of work had been done. As a rule the people carrying on the work were from out of the city and inexperienced in irrigation work. The company fell into financial difficulties. At the time that Mr. Medina says this stock was being offered for sale, I was selling stock in irrigation projects, and water rights in well known and established systems, were selling readily and constantly increasing in value. At the time that a considerable body of shares of The Denver Reservoir and Irrigation Company were sold to the Henrylyn district, the company was in the hands of a receiver. The portion of the water deliverable to the Henrylyn District from Standley lake would have to be delivered by exchange with the river. The Henrylyn District making its diversion through the Burlington Ditch and Standley Lake replenishing the river below to the extent of the diversion. That is the condition today.

The higher the efficiency of a reservoir in relation to the draft under which it is operated, the greater the market price of water. But efficiency alone does not determine the market price.

Q. Directing your attention to Lake Cheesman, are you or are you not familiar with Lake Cheesman?

A. Yes sir.

Q. Various witnesses on behalf of the complainant and the defendant in this case have made various estimates and determinations relative to the possible and actual storages which might be made at Lake Cheesman over a period of years, and the efficiency of the reservoir relative to certain assumed drafts. I call your attention first to

the estimates as made by Mr. Field, a witness for the defend-
1019 ants, and as shown finally by his Exhibit 45 as amended by his Exhibit 46. From that it appears that, according to his assumptions relative to possible storage and actual storages which can be made at Lake Cheesman, and for the period of years from 1902 to 1913, inclusive, upon an assumed draft of 40,000 acre-feet per annum, the efficiency of the reservoir was for all those years, except the year 1904, one hundred per cent, and for the year 1904 eighty-one per cent, making an average efficiency for that period of 98.4 per cent; and his determination further was, upon his assumptions as to possible storage and actual storage which could be made by Lake Cheesman, for the period of years 1901 to 1913, inclusive, upon an assumed draft of 50,000 acre-feet per annum, that the efficiency would have been in ten of those years 100 per cent, and in three out of the thirteen years less than 100 per cent as follows: In the year 1903, 61.5 per cent; in the year 1904, 45.9 per cent, and in the year 1911, 89.71 per cent. I will ask you to state, from your experience in and knowledge of such matters, whether the difference in efficiency exhibited by the operation of Lake Cheesman upon each of those assumed drafts is such—the average efficiency on the 40,000 acre-foot draft being 98.4 per cent, and upon the 50,000 acre-foot draft 92.08 per cent, made up as I have stated—whether the difference is such as to make the market price or value per acre-foot of the water rights under Lake Cheesman less upon the assumed draft of 50,000 acre-feet than upon the assumed draft of 40,000 acre-feet annually.

Objection overruled. Exception.

A. There would be no material difference in the market value of the rights on the two drafts mentioned, with the efficiencies as assumed there. It will be noted that the main deficiency occurs at the same time in each case.

Q. Just what do you mean by the statement that "there would be no material difference" in that respect? What is the material difference in your judgment?

A. I can hardly state any percentages. My thought is this: That with so slight a difference in efficiency, and occurring at the same period in each case, there could be practically no difference in the price.

Q. I call your attention to the fact that the deficiency which occurred on the 40,000 acre-foot draft was a deficiency in the year 1904 caused, as Mr. Field's exhibit showed, by the short supply in the year 1902, and that the largest deficiency which occurred on the 50,000 acre-foot draft was in the year 1904, also caused by the short supply of 1902, as Mr. Field's exhibit shows. Have you taken them into consideration?

A. Yes sir.

1020 Q. What consideration have you given to that?

A. Well, I look upon the season of 1902, with such an abnormally small supply of water, just as I would upon any other calamity to the farmer, such as a hail storm or anything else. Such years do come, and they affect all reservoirs.

Q. On Mr. Field's assumed draft of 40,000 acre-feet, it appears from his exhibit that at the end of each year he had left in his reservoir with which he began the new year a reserve supply bearing the following percentages—or, being the following percentages of his assumed draft of 40,000 acre-feet, to-wit: In the year 1902, 91 per cent; in the year 1903, 33 per cent; in the year 1904, 10.9 per cent; in the year 1905, 100.4 per cent; in the year 1906, 168.6 per cent; in the year 1907, 191.1 per cent; 1908, 102.3 per cent; 1909, 190.95 per cent; 1910, 121.24 per cent; 1911, 38.66 per cent; 1912, 124.16 per cent; 1913, 135.31 per cent; and that in addition to that, upon that 40,000 acre-foot draft, he was obliged to waste over his spillway out of the water available under the appropriation the following percentages of the assumed draft, to-wit: In the year 1902, 29.7 per cent; in the year 1907, 62.39 per cent; equal to 24,957 acre feet in that year; in the year 1908, 9.44 per cent; in the year 1909, 93.76 per cent, equal in that year to 37,505 acre-feet; in the year 1910, 77.96 per cent, equal in that year to 31,183 acre feet. I will ask you to state whether, in your judgment when such results as that are shown in respect to the quantity left in the reservoir at the end of the season, after furnishing the assumed draft, and in respect to the quantity necessarily wasted over the spillway, because of full reservoir, that is a proper and economic method and draft upon which that reservoir ought to be operated?

A. No sir, I don't think it is.

Q. Upon the assumed draft of 50,000 acre-feet, according to Mr. Field's estimates, after furnishing the yearly quota of 50,000 acre-feet, or such percentage as I have already indicated to you, he had at the end of each year the following percentage of his assumed annual draft left in the reservoir: 1901, 114.24 per cent; 1902, 31.64 per cent; 1903, 6.57 per cent; 1904, 8.77 per cent; 1905, 60.75 per cent; 1906, 96.60 per cent; 1907, 140.54 per cent; 1908, 56.14 per cent; 1909, 108.46 per cent; 1910, 77.33 per cent; 1911, 3.13 per cent; 1912, 53.79 per cent; 1913, 45.02 per cent; and in addition to that, out of the appropriation wasted certain quantities over the spillway, the exact amounts of which have not been computed. Considering the reserves left in the reservoir on the 50,000 acre-foot draft at the end of each year, would the reservoir stand an annual draft of 50,000 acre-feet according to Mr. Field's estimate?

A. Undoubtedly would, for irrigation purposes.

1021 Q. That is what I mean.

A. Yes sir.

Q. And in proper and economic irrigation practice, would you leave reserves in the irrigation reservoir to that extent at the end of each season?

A. No sir; not in actual practice.

The Master: Mr. Dorsey, does your question mean that the percentages named were in the reservoir at the end of the irrigation season, or at the end of the calendar year?

Mr. Dorsey: At the end of the calendar year is what I meant, if I did not state it.

Q. State whether or not the end of the calendar year or the beginning of the calendar year, which is the same thing, is in advance of the ordinary period in which irrigation reservoirs are filled?

A. It is in advance of the period where they get the major portion of the water. Ordinarily, there is a comparatively small volume of water for storage in the fall. The floods come in the spring.

Q. Mr. Fellows, also a witness for the defendants, made some estimates of the same sort. The periods which he chose, as I understand his exhibit, practically corresponded with what is ordinarily termed the irrigation season—that is to say, from November 1st to November 1st. According to the testimony and the exhibit of Mr. Fellows upon that subject, which is Exhibit 44, by his estimates of possible and actual storages in Lake Cheesman upon an assumed draft of 40,000 acre-feet, for a period of fourteen years, beginning in the year 1900, so far as the facts which he gathered were concerned, he got these results in respect to efficiency. In twelve of those years an efficiency of 100 per cent, and in two of those years, or irrigation seasons, as it was in his case, namely, that of 1903 and 1904, he got an efficiency of 77 per cent and 62 per cent, or an average efficiency for the 14-year period of 95.6 per cent. Also, upon his estimates as to possible and actual storage in Lake Cheesman and upon the assumption of a 50,000 acre-foot draft, he got these results as to percentages of efficiency in the fourteen-season period. In ten of those seasons, 100 per cent efficiency; in one of them, corresponding to 1903, 28 per cent; in another, corresponding to 1904, 51 per cent; in another, corresponding to 1909, 98 per cent; and in another, corresponding to 1911, 97 per cent, making an average efficiency on the 50,000 acre-foot draft of 91 per cent. State whether or not, in your judgment, there is a sufficient difference in the percentages of efficiency shown upon the 40,000 acre-foot draft and the 50,000 acre-foot draft, respectively, to make any difference in the market price or value per acre-foot of the water rights?

A. No sir; I don't think there is sufficient difference in the efficiency to make any difference in the market value of the water rights.

1022 Q. I call your attention to the fact that upon the 40,000 acre-foot draft, as estimated and testified to by Mr. Fellows, and as shown by his Exhibit 44 for this period of fourteen years beginning in 1900—fourteen seasons—he had left at the end of each irrigation season—that is to say, on November 1st of each year—the following percentages of his assumed draft in his reservoir before he began to store for the following season, to-wit: In the first year 133.68 per cent; the second year, 107.83 per cent; the third year, 58.79 per cent; the fourth year, nothing; the fifth year, 1.78 per cent; the fourth and fifth years corresponding with the calendar seasons of 1903 and 1904; in the sixth year, 64.90 per cent; the seventh year, 89.93 per cent; the eighth year, 177. per cent; the ninth year, 92.24 per cent; the tenth year, 181.67 per cent; the eleventh year, 107.83 per cent; the twelfth year, 40.25 per cent; the thirteenth year, 131 per cent; the fourteenth year, 154 per cent; and in addition to that, in each of those seasons, out of the waters avail-

able under the appropriation of Lake Cheesman, he wasted over the spillway the following percentages of his total assumed draft, to-wit; In the first year, 157.5 per cent, equivalent to 63,005 acre-feet; the second year, 23.4 per cent, equipment to 9,359 acre-feet; the eighth year, 25.9 per cent, equivalent to 10,360 acre-feet; the ninth year, 18.4 per cent, equivalent to 7,367 acre-feet; the eleventh year, 118.8 per cent, equivalent to 47,516 acre-feet; and the fourteenth year 4.5 per cent, equivalent to 1,825 acre-feet. In your judgment, considering the quantity left in the reservoir at the end of each irrigation season, as so indicated, and the quantity necessarily wasted over the spillway because of a full reservoir, upon the assumed draft of 40,000 acre-feet, is a draft of 40,000 acre-feet the proper and economic draft annually at which to operate that reservoir in proper irrigation practice?

A. No sir; it is not.

Q. Why not?

A. Too much water wasted; too much held over.

Q. Just what do you mean by that? That the draft could be properly and economically increased, and that it could be operated at a higher draft in a manner satisfactory to the consumer?

A. Yes sir. It could be operated at a higher draft, with equal satisfaction to the consumers, and with a good deal less waste of water.

Q. Is that also what you meant in respect to Mr. Field's estimates of operation at a 40,000 acre-foot draft, in the same regard?

A. Yes.

Q. Mr. Fellows also has figured, according to his estimates upon operating the reservoir at an annual draft of 50,00 acre-feet, and he covers the same period with his figures—fourteen irrigation
1023 seasons, beginning with that of 1900. Operating according to his figures, as shown by his Exhibit 44, on the 50,000 acre-foot draft, he has left in the reservoir at the end of each irrigation season and before commencing to store for the next, the following percentages of his annual draft: The first year or season, 95 per cent; the second year, 69.5 per cent; the third year, 11.2 per cent; the fourth year, corresponding to 1903, nothing; the fifth year, corresponding to 1904, nothing; the sixth year, 31.4 per cent; the seventh year, 32.8 per cent; the eighth year, 84.3 per cent; the ninth year, 13.3 per cent; the tenth year, 70 per cent; the eleventh year, 69.5 per cent; the twelfth year, corresponding to 1911, nothing; the thirteenth year, 54.7 per cent; the fourteenth year, 59.4 per cent; and at the same time, under those conditions, was obliged to waste over the spillway, because of full reservoir, the following quantities in percentages of the assumed annual draft: The first year, 118 per cent, equivalent to 59,005 acre-feet; the second year, 4 per cent, equivalent to 2,024 acre-feet; and the eleventh year, 15.3 per cent, equivalent to 7,630 acre-feet. Considering the reserve or the quantity held in the reservoir at the end of each irrigation season and the quantities necessarily wasted over the spillway upon the 50,-000 acre-foot draft, as estimated by Mr. Fellows, what do you say as to whether or not the 50,000 acre-foot draft annually is as high a

draft as, according to his estimates, the reservoir could be operated at, properly, economically, and to the satisfaction of consumers?

A. According to his estimates, I think it could be operated at a slightly higher draft—not much higher.

Q. Mr. Bull also made estimates upon this subject, as shown by his Exhibit 39. Mr. Bull, in his Exhibit 39, sets forth his testimony upon the subject, according to his estimates of total possible storage and of actual storage in Lake Cheesman, determined what the results would be upon an assumed draft as follows: 40,000 acre-feet annually, 50,000 acre-feet annually and 60,000 acre-feet annually for the period 1901 to 1913, inclusive. On the 40,000 acre-foot annual draft he showed an efficiency of 100 per cent in each of the thirteen years; on the 50,000 acre-foot draft he showed an average efficiency of 93.2 per cent for the period of thirteen years, made up as follows: Ten years of 100 per cent efficiency, one year of 57.98 per cent efficiency, one year of 70.38 per cent of efficiency and one year of 82.99 per cent of efficiency; the low year being caused, as his exhibit shows, by the slight supply of 1902.

A. Pardon me, what was the percentage in the low year?

Q. 57.98. And on the 60,000 acre-foot draft, as estimated by him, according to his assumptions for the same period of
1024 thirteen years, he showed an average efficiency of 84.8 per cent, made up as follows: Eight years out of the thirteen, 100 per cent; and of the other years, 1902, 95.2 per cent; 1903, 19.5 per cent; 1904, 58.6 per cent; 1911, 42.9 per cent; 1913, 86.6 per cent. I will ask you to state whether or not, in your judgment, there is a sufficient difference in efficiency, according to Mr. Bull's estimates and upon those various assumptions of annual draft, to make any difference in the market price or value per acre-foot of a water right under the lake ?

A. As between the 40,000 and 50,000 acre-foot drafts, no difference. As between the 50,000 and 60,000 acre-foot drafts, there might be a slight difference, but not enough to justify the operating on the lower draft. I might say, if you will permit, that giving an estimate on these high percentages of efficiency is to me a little absurd, because, while I know the reservoirs of Colorado pretty well, I don't know of any that actually give an efficiency like many of these mentioned. I would like to, therefore, qualify my statemnt.

Q. When you say that you don't know of any reservoirs which give an efficiency like these estimated here, you mean that you don't know of any so high, or that you don't know of any so low?

A. I don't know of any so high as most of the figures you have called.

Q. About what percentage of difference would there be in the unit price as between the 50,000 and the 60,000 acre-foot annual draft as estimated by Mr. Bull?

A. Not to exceed five per cent.

Q. Mr. Anderson also made an estimate on behalf of the complainant for the years corresponding with those estimated by Mr. Bull, and upon an assumed draft of 60,000 acre feet, and Mr. Bull in his Exhibit 39 set forth the figures found by Mr. Anderson, as he under-

stood them, and upon that assumption of 60,000 acre-feet Mr. Anderson's results, as shown by Mr. Bull, gave a percentage of efficiency for Lake Cheesman of 100 per cent for ten years out of the thirteen years, from 1901 to 1913, inclusive and for the other years the following percentages of efficiency: In 1903, 27 per cent; in 1904, 59.2 per cent; and in 1911, 84.2 per cent, giving an average efficiency for the entire 13-year period of 90 per cent. As between the efficiencies shown by Mr. Bull upon his estimate and assumed draft of 50,000 acre feet per annum of 93.2 per cent, and Mr. Anderson's efficiency as determined by Mr. Bull on the 60,000 acre-foot draft (not Mr. Anderson's efficiency but that of Lake Cheesman, according to Mr. Anderson's exhibit), of 90 per cent, what do you say as to whether or not there is a sufficient difference in efficiency to cause any dif-
1025 ference in the market price or value per acre-foot?

A. There isn't a sufficient difference in efficiency to cause any difference in the market price on those two bases.

Q. As between Mr. Bull's estimate, according to his figures, and upon his assumed draft of 60,000 acre-feet per annum, yielding an average efficiency of 84.8 per cent, as before stated, and Mr. Bull's figures in respect to the estimates of Mr. Anderson, upon an assumed draft of 60,000 acre-feet annually, yielding an average efficiency of 90 per cent, made up in the manner described awhile ago, is there enough difference between those two estimates and efficiencies to create any difference in price or value per acre-foot?

A. I think there would be a slight difference in favor of Mr. Anderson's efficiency, as to value.

Cross-examination by Mr. Nye:

Have lived in Colorado 27 years. For seven years prior to 1894 was employed in a real estate office, the principal business of which was making loans. In 1894 I entered the employ of The Colorado Mortgage and Investment Company. Remained with them about 12 years in charge of their outside lands and ditches. At first only a portion of them. After a few years all of them. It controlled the High Line, Evans No. 2, Larimer a nd Weld, Loveland and Greeley, ditches, and was interested in the Lower Latham and some ditches on Boulder creek.

It controlled the Loveland and Greeley Reservoir with a capacity of about 15,000 acre feet. I kept the record of water run from that reservoir but did not have personal charge of operation. I managed the High Line, Evans No. 2, and Loveland and Greeley Ditches. Since leaving the employ of The Colorado Mortgage and Investment Company, I have had personal charge of the Lupton Bottom, Meadow Island and Ellwood ditches, during 1907, 1908. And since then have been connected with ditches in District No. 2, as secretary of The Consolidated Ditches Company. As secretary of that organization have had charge of the observation of the distribution of water on the river above and below District No. 2, in all districts tributary to the river. Have been a director in the Antero and Lost Park Reservoir Company. Have not had direct personal charge in the management of any reservoir property except the Greeley and Loveland and

the Antero and Lost Park, but have represented large stockholders in other systems. Have sold something like 10,000 acre feet of water rights from the Antero and Lost Park Systems. The prices ranging from $25 to $35 per acre foot capacity. The average delivery under the rights so sold has been from one-half to three-quarters of an acre foot.

1026 The last sale I made was about June 1st, 1914. It was for a private individual. The price I think was $27.50 per acre foot. I became associated with the Antero and Lost Park Reservoir Company at its organization in 1907. Was elected director at its first annual meeting, am now a director. Am also a director in The Tarryall Canal and Reservoir Company and The Interstate Irrigation and Land Company. Am not connected with any irrigation company except those drawing water from the Platte river or tributaries above Denver. My connections with companies in the Poudre, Big Thompson, and St. Vrain districts, ceased from 7 to 9 years ago.

Was actively engaged for the Colorado Mortgage and Investment Company in selling land and water in the Poudre valley for a period starting 15 years ago and ending 9 or 10 years ago. This company was largely interested in the ownership of lands, ditches and reservoirs and in the construction of reservoirs there. The company also had under cultivation in that district from 4,000 to 5,000 acres of land. It was during the progress of that work that I became intimately acquainted with the irrigation systems in Northern Colorado. Have made investigations of the value of water in that section during the last year. I think the information is just as explicit as the information I had years ago, except that it is more dependent upon information received from others. Have never been regularly employed by the D. U. W. Co. Am employed in connection with this case and was employed during the 1907 appraisal in connection with water right matters. Part of my work in connection with The Consolidated Ditches Company consists of ascertaining what infringements are being made by other districts or ditches upon the rights of those ditches. I have probably participated in 25 suits relating to such questions. No such suits have been brought by the Consolidated Ditches Company against the D. U. W. Co. Matters have come up from time to time which have been discussed and adjusted. As to the waste gates of the ditches, regarding which I testified, I know that the law provides that proper waste gates and waste ways shall be provided for conveying all surplus water back to the river. I do not know that any of these do not comply with the law, but in my judgment there are a good many of them that are not made necessary by the law. The Lupton Bottom Ditch, which I testified obtained a portion of its supply from waste water in Big Dry creek, has no decree from Big Dry creek. All of its decrees are from the Platte river. It was not my intention in calling attention to the manner in which some of the water records in District No. 8 were kept for the

1027 year 1913 to discredit all the testimony in this case on account of the deficiencies in those records.

There are many ditches on the river that do not make a practice of diverting a full volume of water at the headgate and regulating

at waste gates. One of them is the High Line, which frequently, except in dry seasons, does not divert its capacity, though the water is available for it at Platte Canon. Others are the Platteville, and the Brantner. When I said that the Last Chance and these other ditches were accustomed to draw rather a full volume of water and regulate it at the waste gates, I meant a good volume of water to work with, not necessarily the full capacity of the ditch. I did not intend to intimate that these ditches in diverting a rather full volume were diverting more than their decrees or even the amount of their decrees. But I intended to be understood that in my judgment they were diverting more than they were entitled to divert because they were not applying the water to a beneficial use. I think I was justified in that conclusion if they wasted it back into the river or if they applied it wastefully.

The water that is wasted back into the stream by these several ditches is available for use by other ditches below. There has been an increase in the acreage irrigated under the High Line ditch of 10 or 15 per cent as a result of the application of the supplementary reservoir supply. Those acres were not irrigated at all before the additional supply was provided. The original direct supply has been used as an early season supply on this additional acreage but there has been no enlarged use of water in the sense that the direct flow diversion has been increased. About 12,000 acre feet of stored water has been sold under the Antero and Lost Park system and the remainder of the capacity contracted for sale under the Doherty contract, which will expire the 15th of this month unless it is taken up or extended. The present capacity of Antero Reservoir is 58,000 acre feet. The state engineer has never permitted, nor has the company asked for permission to store more than 40,000 acre feet because of the condition of the riprapping and concrete face of the dam. Personally I would not feel justified in storing that much with the riprapping in its present condition. My statement of opinion that there was no possibility of material increase in the acreage irrigated under the High Line referred to the possibility of increase under its direct rights. It is my opinion that the acreage will be increased by the use of additional stored water. The rights sold out of the Antero reservoir are all supplemental rights. There have been no rights sold out of the Lost Park reservoir which is not yet completed.

1028 Exhibit A.57, is a true copy of the provisions of the decree relating to certain reservoirs about which I testified on direct examination. Offered and admitted. The decree was entered about a year ago. The proceedings in relation to this adjudication had not been commenced in May, 1908, and I rather think had not been commenced in July, 1910. The decree of Jefferson Lake, June 25, 1888, is prior to Lake Cheesman, and that of the Michigan Reservoir, Sept. 21, 1891, is prior to the second priority of Lake Cheesman. Aside from these there are only two other priorities prior in time to July 1, 1908, namely, The Lost Park Reservoir and the Antero Reservoir. When I testified to the 207,550 acre feet of decreed capacities under this decree, I did not mean that those figures represented demand upon the stream under existing construction, which would be far less than the decreed capacity. The present capacity

of the Antero, being about 50% of its decreed capacity. That of the Lost Park reservoir, less, and the Link-Slater reservoir under its present construction has no storage capacity. It is my opinion that an increase in the acreage under the High Line Ditch due to the use of stored water will not increase the demand for direct flow water.

Any additional direct supply that the High Line might obtain would be very spasmodic and would not justify an extension in acreage that would increase the demand for direct flow water. The increase in the Poudre valley practically doubling the acreage irrigated there was due entirely to the addition of stored water. I don't know as to every one of the hundred or more ditches taking the water out of the Poudre river. I testified about three or four specifically. That is not the limit of my knowledge of ditches in the Poudre valley, but I do not know about all of them. I am at present farming two or three thousand acres of land under irrigation, partly on my own account, partly for others. Most of them under the High Line Ditch. Most of the lands have both direct and storage rights, some only direct rights. Last year I farmed some lands under the Rocky Mountain ditch. And up to three or four years ago under a number of other ditches, concerning which I have testified.

In general, the only ditches that have any considerable amount of land irrigable but not irrigated under them are the ditches that I call flood water ditches. Under the ditches having rights capable of an increased use, little or no land is available that is not now irrigated. Until it is actually worked out it is impossible to say how many of the 110,000 acres capable of irrigation under the High Line will take reservoir water, either as a sole or supplemental supply. Both the Lower Latham and the Evans No. 2 ditches have their intakes above the ridge that I mentioned between Beebee draw and
1029 Box Elder creek. The Lower Latham is located about 20 miles down stream from the Evans No. 2 and goes around the north end of the ridge without touching it. Milton Lake is located in Beebee draw and is supplied from the South Platte River and from such floods as come down the draw. The Horse Creek reservoir has been operated for two or three years, serving lands under the Henrylyn system. I stated that direct flow rights are not comparable with storage rights, because the diversion is limited by the decree. If an irrigator under a direct flow system has a right to 1 second foot of water, which is available at any time at any year, he diverts under that a certain volume of water. If he had a reservoir supply he could divert that same volume of water at the rate of 5 cubic feet per second with better results.

A man who has a storage right may take 5 second feet one day instead of one second foot for five days. In ditches where a reservoir supply has been used for a number of years they maintain a sufficient head of water in the ditch, which can be regulated day by day on short notice, so that the consumers, subject to reasonable rules, can get the water whenever they want it and in such volume as they want it. The reservoirs do not maintain a greater head than the users want. The users notify the company when they wish the water. The volume turned into the ditches is regulated every day at the respective reservoirs according to the needs of the owners of

storage rights under the system. In other words, the regulation of the reservoir is on the demand of the consumer. In case of shortages in the supply each man gets his proportionate share so long as the water lasts. The method of operation is the same. Water is run in practically continuous flow in the latter part of the irrigating season after the direct flow supply ceases. There are cases like the Antero reservoir, where the stored water is discharged in periodical runs for a certain number of days, and the irrigators take their water during these runs.

So far as the individual irrigator is concerned, there is no difference between a direct flow right that furnishes him all the water he needs when he wants it and a reservoir right that does the same. But volume for volume, stored water is worth twice as much as direct flow water, because of the season in which it comes. An acre-foot of water available in August is worth more than an acre-foot available in May, if it is available only in May. It is my judgment that reservoir water used as a sole supply and required at all times in the irrigating season is not as valuable as such water used as a supplemental supply. So as a sole source of supply, reservoir water is measured in its value by the period at which it is used, just
1030 the same as if it were part direct and part reservoir. In the case of the Home Supply Ditch, I stated that the value of the combined direct flow and storage rights was $45 per acre-foot and that the stored water was worth twice as much as the direct flow water, making the value of the stored water, in round numbers, $60 per acre-foot and the direct flow water $30 per acre foot.

I do not think that the variations in efficiency of Lake Cheesman, as estimated by the several witnesses, concerning whose estimates I was interrogated on direct, are of sufficient moment to materially vary the market value of the water from the reservoir. I understand that in the cases of witnesses Field and Bull, that the amounts of water carried over from year to year were based on the conditions at the end of the calendar year, also considered that the period at the end of the irrigation season, November 1 to January 1, is usually a period of small stream flow and little storage.

In my opinion, the market value of storage water capable of equally efficient service, is generally the same without regard to the reservoir from which it is obtained. I do not know of any reservoir giving so high an efficiency as that covered by most of the figures for Lake Cheesman. I know the efficiency of a number of reservoirs in addition to those in which I have been directly interested; among them Lake Loveland, The Seven Lakes and the Lower Latham reservoir.

Lake Loveland is recognized as one of the most efficient reservoirs in the whole Greeley district. I operated it in 1902, when it stored less than 5% of its capacity, and I think I am justified in saying that all the reservoirs in the Big Thompson District stored no water that year. I see no engineering difficulties in the way of figuring out reservoir efficiency if you have accurate records.

Redirect examination by Mr. Dorsey:

The Colorado Mortgage and Investment Company was commonly

known as the English company. Its operations were along the line of construction, development and operation of irrigation enterprises, purchase and sale of lands, and making of loans. It owned and farmed large bodies of land. It owned in Northern Colorado 75,000 or 80,000 acres. Its principal irrigation construction was the Larimer and Weld, Loveland and Greeley, Evans No. 2 and the High Line Ditches. Lands lying behind the ridge, which I have described as obstructing the Evans No. 2 and other ditches, cannot be irrigated from the Lower Latham Ditch, which passes north of the ridge, because they lie above it. If the Evans No. 2 were extended to go around the ridge it would reach only a small portion of them
1031 because of the loss of elevation in going around. Plans have been made to irrigate these lands through the Burlington Ditch, which lies above the ridge. Storage rights out of the Antero reservoir have been sold on the basis of the ultimate capacity of the reservoir, 85,600 acre-feet.

When I stated that the acreage under the High Line might be increased through the use of supplemental storage supply, I referred to the acreage now irrigated, about 24,000 acres. Not to the 110,000 acres capable of being irrigated under the ditch. In mentioning the ditches under which I had carried on farming operations I omitted the Farmers High Line, under which I farmed 320 acres for 10 or 12 years up to six or seven years ago. I have been familiar with the farm since and sold a portion of it within the last three months. Objection sustained as to interrogation in re how much of the 100,000 acre-feet of the D. U. W. Co.'s supply might be absorbed by the remainder of the 110,000 acres capable of irrigation under the High Line Ditch. Exception. The limitations of decrees are the same in the case of direct flow rights under a ditch of early priority, as under flood water ditches. In the operation of reservoirs maintaining a reasonably constant discharge, the flow is regulated in accordance with requisitions from water consumers stating their needs in quantity and desires as to time of delivery of water.

In my opinion, the failures of supply that have occurred in Lake Cheesman, on the estimate of a 60,000 acre-foot annual draft, are not sufficient to affect the price or value per acre-foot of yield.

Recross-examination by Mr. Nye:

The sale of water rights by the Antero and Lost Park Reservoir Company has been confined to the Antero Reservoir. No rights have yet been sold from the Lost Park Reservoir. The only canal that the company owns through which these rights can be applied is the High Line. About 12,000 acre-feet out of the total capacity of 85,000 acre-feet of the Antero Reservoir rights have been sold to private owners independently of the Doherty contract. The Doherty contract included the sale of both the High Line Ditch and the Antero Reservoir, so that whatever direct flow rights were available were included in the contracted purchase.

I cannot state to what extent the acreage under that system may be increased under the combined supply, without passing upon the efficiency of both the High Line ditch and the Antero reservoir.

1032 Witness CHARLES W. COMSTOCK.

Direct examination by Mr. Dorsey:

Have made a study of the duty, in acre-feet per acre, of the original water flowing out of Platte Canon at the head of District No. 8, with respect to the acreage irrigated in Districts Nos. 8 and 2, combined, as compared with the duty of like original water of the Poudre river at the head of District No. 3, as testified to by defendants' witness, John E. Field, in the case of the State of Wyoming against the State of Colorado. Transcript of which is Exhibit A.65 in this case. Mr. Field stated the total discharge of the Poudre river at the head of District No. 3 to be 1.35 acre-feet per annum per acre irrigated in the district. He stated that a discharge of 254,000 acre-feet was necessary at Platte Canon in the seven months from April to October, inclusive, to supply the acreage irrigated in Districts 8 and 2, under ditches prior in right to Lake Cheesman. The largest acreage reported in these districts is 120,000 in 1912, making the original water duty 2.12 acre-feet per acre at Platte Canon. The average acreage for four years, 1909 to 1912, is 112,000, on which the original water duty, according to his estimate, is 2.25 acre-feet per annum per acre. These duties are based upon the entire acreage irrigated in the district without regard to whether they are irrigated from rights prior to, or subsequent to, Lake Cheesman. Exhibit A.78 is a map taken from the 14th Biennial Report of the State Engineer of Colorado, showing the boundaries of the various water districts. Offered and admitted. (Statement of the boundaries of Districts 2, 3 and 8.) Map marked to indicate the mouth of Poudre canon with reference to irrigated area in District No. 3, and Platte Canon with reference to irrigated area in Districts 2 and 8. Water District No. 1 lies immediately below districts 2 and 3, and water from both 2 and 3 is discharged into District No. 1, which extends east to the east line of Morgan County.

The accretions to the Poudre river between the canon and the mouth of the river, where it discharges into the Platte, are very small. With possibly one exception its tributaries discharge water only at flood periods. District No. 3 embraces the entire watershed of the Poudre from the canon to its mouth. The accretion to the South Platte in Districts Nos. 2 and 8, between Platte Canon and the junction of the Platte and Poudre at the lower end of District No. 2 is very considerable. Its principal tributaries being Plum creek, Bear creek, Cherry creek, Clear creek, and the St. Vrain and Big Thompson rivers. A number of other creeks contribute a good deal of water at flood periods. In Exhibit A.65 Mr. Field stated
1033 that the total accretions to the Poudre river between the mouth of the canon and the lower end of District No. 3 amounted to 10,000 acre-feet annually. The accretions to the South Platte in Districts 8 and 2 exceed that many times.

I do not know how much because there are no gauging stations. The distance from the mouth of Poudre canon to the lower end of District No. 3 is from 35 to 40 miles. The distance from Platte Canon to the lower end of District No. 2 is about 75 miles. The irrigated area in Districts 2 and 8 is much narower and longer

than in District No. 3, and the seepage and return flow is greater. Topographically, and in a general way, geologically, all of these districts are alike. Mr. Fellows, making an estimate similar to that of Mr. Field, stated a requirement in original water at the mouth of Platte Canon for Districts 8 and 2 to be 223,467 acre-feet during the seven months, April to October, equivalent to a duty of 2 acre-feet per acre on the average acreage irrigated in the period 1909 to 1912, or 1.86 acre-feet per acre on the acreage irrigated in these districts in the year 1912. The estimates of both Mr. Field and Mr. Fellows are on the amount of original water required at the head of the districts, entirely disregarding accretions from tributary streams. Mr. Fellows in determining storage available at Lake Cheesman took the total discharge of the stream, month by month, at Platte Canon, and from each month's discharge deducted his estimate of the amount required for irrigation in that month, without regard to how the flow occurred. It frequently happens that a month's record will be made up of a large number of days of very low flow and a few days of very high flow, during which storage would be permitted because of the inability of ditches to take all the water. This condition received no consideration under Mr. Fellows' method, because the average result for the month, expressed in total acre-feet, may show insufficient water for his demand, though in fact the few days of very high water might afford a considerable amount of legitimate and proper storage. I have examined the daily records of stream flow and find variations of as much as several hundred second feet from one day to the next.

The average annual discharge of the South Platte river at Platte Canon shown by all the records that are available, from 1887 to 1913, is 242,270 acre feet. And the average discharge per year for the seven months, April to October, is 201,826 acre feet.

Mr. Field's estimate of 254,000 acre feet, required for irrigation during those seven months, is 52,000 acre feet more than the average yield of the river.

1034 Mr. Fellows' requirement of 223,467 acre feet is about 22,000 acre feet more than the average yield of the river, and those requirements are only for ditches prior to Lake Cheesman.

Mr. Field's requirements for the seven months, are approximately 12,000 acre feet more than the average yield of the river for an entire year. The actual average monthly discharge of the Platte river at the mouth of the canon for the period 1887 to 1913, is insufficient to meet the requirements of either Mr. Field or Mr. Fellows except in two months of the seven which they include in the irrigation period. Those two months being April and May. Measurements are not available for all of the months in all of the years. Different months being missing in different years.

In two years out of eighteen available the discharge of the river in the month of April was insufficient to meet the requirements of Mr. Field.

In ten years out of 21 years available it was insufficient in the month of May.

In 13 years out of a total of 21 available it was insufficient in the month of June.

In 19 years out of a total of 22 available it was insufficient in the months of July and August.

In 21 years out of a total of 22 available it was insufficient in the month of September.

In 15 years out of a total of 21 available it was insufficient in the month of October. I will prepare a similar comparison of stream flow available to meet the demands on the canon by the ditches below as specified by Mr. Fellows.

According to the annual report of the division engineer for Division No. 1. The following are the acreages irrigated under the Nevada and Last Chance ditches and the duty of water for the years 1909 to 1913, inclusive. The Nevada ditch, 1909, 1,701 acres, duty, 4.94 acre feet per acre; 1910, 1,425 acres, duty, 6.28 acre feet per acre; 1911, 1,640 acres, duty 7.84 acre feet; 1912, 1,778 acres, duty, 4.68 acre feet; 1913, 1,640 acres, duty, 12.27 acre feet per acre. Last Chance ditch 1909, 960 acres, duty 4.34 acre feet; 1910, 1,017 acres, duty, 4.69 acre feet; 1911, 1,065 acres, duty, 4.72 acre feet; 1912, 1,115 acres, duty, 6.52 acre feet; 1913, 1,100 acres, duty, 7.88 acre feet.

The average diversion of water in Districts 2 and 8, for the years 1909 to 1912 inclusive, is 3.58 acre feet per acre. In districts Nos. 3, 4, 5, 6, and 7, the average diversion of water in the years 1909 to 1912, inclusive, is 1.31 acre feet per acre. Shown by Exhibit A-799. Offered and admitted. These are the districts that adjoin Districts Nos. 2 and 8. The irrigated area in District No. 3 is
1035 approximately double the area in Districts 2 and 8. District No. 4 approximately 100,000 acres. No. 5, 90,000 to 100,000 acres. No. 6, approximately 90,000 acres. No. 7, approximately 90,000 acres. The four years' average for Districts 2 and 8 was 112,000 acres. As to topography, soil and climate, Districts, 3, 4, 5, 6, & 7, are as nearly like Districts 2 and 8 as two areas can be. In making my computations of available storage in Lake Cheesman, I took into consideration the requirements of the Platte Canon ditch, basing my estimates on the daily stream flow in the river at Platte Canon. Exhibit A-80, shows the shortages of supply to the Platte Canon ditch based on daily records of stream flow to the extent that they are available, after I had deducted from the stream flow the quantities available for storage in Lake Cheesman and also taking into consideration the shortages occasioned by actual deficiencies in the stream which were not affected by storage allowed for Lake Cheesman, and the demands of ditches prior in time to the Platte Canon Ditch.

Omitting the year 1902, the year of lowest stream flow, the average efficiency of the Platte Canon Ditch after making these deductions is in excess of 94%. Exhibit A-81 shows the quantities of water that would be available in the river for other uses after I have made deductions for the storage allowed for Lake Cheesman in my estimate. The table is based upon the record of daily stream flow to the extent that such record is available. It shows an average annual discharge after storage is deducted of 187,186 acre feet, and an average discharge per year for the months of the irrigation season, May to October, of 144,213 acre feet. In estimating storage for

Lake Cheesman, I allowed no storage in excess of the capacity of the lake, 79,064 acre feet, in any one year. Whenever the possible storage exceeded that I took out only the capacity.

The exhibit covers the years from 1900 to 1913, inclusive, and is based upon all of the records of stream flow that are available. The total annual discharge at Platte Canon, shown by Exhibit A-81, after deducting my estimate of available storage, is equivalent to 1.56 acre feet per acre on the 120,000 acres reported in Districts 8 and 2 for 1912, at 1.67 acre feet per acre for the average acreage for the years 1909 to 1912. These figures being comparable with the 1.35 acre feet stated by Mr. Field as available in District No. 3 as shown by Exhibit A-65. In arriving at his figures, 1.35 acre feet per acre in District No. 3, Mr. Field included the entire annual flow of the Poudre river. Making the computation on the basis of the supply available at Platte Canon in the months of May to October, after deducting estimated storage, the quantity is equivalent to 1.2 acre feet per acre for the acreage reported in Districts No. 2 and 8 for the year 1912, and 1.3 acre feet for the average acreage for the years 1909 to 1912 inclusive. The use of these acreages in Districts 2 and 8 disregard whether they are irrigated under priorities antedating, or subsequent to, the priority of Lake Cheesman. Exhibit A-81 offered (not admitted).

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Exhibit A-82, is a record of precipitation and temperatures from United States Weather Bureau stations located in the neighborhood of water districts 2, 3, 4, 5, 6, 7 and 8. The statement of altitude at the several stations, is also from the Weather Bureau records. Offered and admitted. Objection. Exception.

Denver is located on the line between districts 8 and 2, south of the geopraphical center of the districts, from north to south, and about in the center of the districts from east to west. Fort Lupton is located in District No. 2 north of the geographical center of the district, from north to south, and about in the center from east to west.

The average of the precipitation between Fort Lupton and Denver would be a fair average on the irrigated lands in Districts 2 and 8. Longmont is in Water District No. 5. Loveland is in District No. 4. Fort Collins and Greeley in District No. 3. The average of the precipitation between Fort Collins and Greeley would fairly represent the average on the irrigated land in District No. 3. Cheyenne is located from 30 to 35 miles north of the North boundary of District No. 3, and 107 miles north of Denver. Much farther away from any important mountains than Denver. The average of the precipitation at Denver, Greeley and Cheyenne would not be a fair average of the precipitation on the irrigated lands in Districts 8 and 2. Its distance from the district as compared with stations at Greeley and Denver should exclude it from consideration. The record of precipitation at Boulder, Longmont, Boothroyd's ranch, and Fort Collins, would not fairly represent the average precipitation upon the irrigated lands in Districts 3, 4, 5, 6 and 7. All of the stations, except Longmont, are well to the west of the irrigated area and well in the foot hills and the precipitation is not fairly indicative of the pre-

cipitation on the irrigated lands in the districts named. Exhibit A-83 shows from all available records the discharge of the South Platte River at South Platte or Platte Canon in each month of each year since the record has been kept. Offered and admitted.

The record is without any deductions on account of storage at Lake Cheesman, and shows the discharges on which I based my statement concerning the ability of the river to satisfy the requirements set forth by Mr. Field. I have made a determination of the ability of the average monthly discharge of the South Platte
1037 river at Platte Canon to meet the demands specified by Mr. Fellows as necessary to satisfy the requirements of the ditches below, prior in point of time to Lake Cheesman. There is no record in April of any year in which the supply would have been insufficient.

In five years out of 21, where records are available, the supply would have been insufficient in May.

In 14 years out of 21 available, it would have been insufficient in June.

In 18 years out of 22 available, it would have been insufficient in July.

In 14 years out of 22 available, it would have been insufficient in August.

In 19 out of 22 years available, it would have been insufficient in September.

And in 18 years out of 21 available, it would have been insufficient in October.

The requirements specified by Messrs. Field and Fellows are for rights prior in time to Lake Cheesman and do not take into account the requirements of rights subsequent to Lake Cheesman. Exhibits A-84 and A-85, are hydrographs showing the daily flows in the South Platte River for each day during all the years that records have been kept. The red line indicates the flow of the river as shown by the reports from gauging stations in Platte Canon. The green line represents my estimate of the water available for storage in Lake Cheesman. The yellow line represents my estimate of the quantity of water required at Platte Canon to supply rights prior to Lake Cheesman in Districts Nos. 2 and 8. The horizontal scale of the hydrograph is one millimeter for each day, the vertical scale one millimeter for 10 cubic feet per second. Whenever monthly averages were given and daily records were not available I have used the monthly averages, whenever there is nothing platted on the exhibit it indicates that neither daily nor monthly records were available.

The red line for the years since the construction of Lake Cheesman and the Antero reservoir represents the actual flow of the stream after these reservoirs had taken from the stream such quantities as they actually stored, or after they had added to the stream such quantities as they had discharged. Except where the stream flow is affected by either storage or discharge by Lake Cheesman or Antero, the distance from the green line up to the red line, indicates the quantity of water remaining in the stream after my estimated storage is taken out. There are times in the winter months when the green line appears above the red line, this does not indicate that

more water was storable than was in the river, because the red line represents the river after the water stored in Cheesman or
1038 Antero has been taken out. The variations in stream flow indicated by the red line are in chronological order day by day as they occurred. Exhibit A-85, is prepared in the same general way as Exhibit A-84, but the vertical scale is twice as large. The red line shows the quantity of water left in the river after taking out my estimate for storage in Lake Cheesman, in other words, it indicates my estimate of the actual storage which could occur, limited by the capacity of the reservoir each year. This was prepared from the stream flow tables showing the daily flow of the river corrected for storage or discharge at Lake Cheesman to indicate the conditions that would exist if Lake Cheesman had not been constructed. It was not corrected for the operations of Antero reservoir because no records are available from which such corrections could be made.

The yellow line indicates my estimate of the amount of water required to satisfy rights in Districts 2 and 8, prior to Lake Cheesman. Where the red line falls below the yellow line it indicates that the river was not sufficient to meet my estimate of the demand on it by rights prior to Lake Cheesman. Those shortages would have occurred if Lake Cheesman had not existed. In a general way the distance from the yellow line up to the red line represents the excess of water over and above my estimate of the requirements after storage for Lake Cheesman has been taken out.

It probably would have been better if Exhibit A-84 had been prepared from the tables of corrected stream flow rather than from the recorded stream flows, but work was started on it before the tables of corrected stream flow were worked up. The result of the preparation of A-84, from the recorded stream flow is to show over the period of years, one less filling for Lake Cheesman than could have actually been accomplished, plus whatever water was stored in Antero Reservoir at the close of 1913. In other words, Lake Cheesman was full at the close of 1913 and there was some water stored in Antero Reservoir. The aggregate of the storage in the two reservoirs is not accounted for in the stream flow tables, consequently the hydrograph record is short to that extent. Exhibits A-84 and A-85 offered and admitted. I was state engineer for 4 years in the period immediately preceding the present term of Mr. John E. Field. Water commissioners are men local to the districts which they represent. It has been my experience that in demanding water they work in the interest of their own district as much as possible without regard to the requirements or rights of adjoining districts. Their reports as to actual diversion, generally speaking, should be quite accurate. Gauges and rating flumes are provided in all ditches and if the water commissioner attends to his duties he has every
1039 possible facility for acquiring that information. I have examined the reports of the water commissioner of District No. 8 on the Nevada and Last Chance ditches for the year 1913, and I don't believe that those figures are correct. The water commissioner in that district in 1913 was a new man in his first season as commis-

sioner. The measurements of the diversions by the ditches are taken at or near the head gates, and if water is returned to the stream unused through waste gates located below the point of measurement, the water so returned would be included in the figures of diversion for the ditch.

The reports of the water commissioners as to the quantity of water flowing into, and out of, their districts are very frequently inaccurate. Though in some cases there is no excuse for inaccuracy. In the case of District No. 8 there is a gauging station in Platte Canon at the head of the district at which the water commissioner can always determine the amount of water flowing into the district. There is a gauge at Denver at the lower end of the district from which he can always determine the quantity of water flowing out of the district. The State engineer's office furnishes rating tables for these gauging stations for the information of the water commissioner. The gauge in Denver on the river also shows the quantity of water flowing into District No. 2 from District No. 8. There is no gauging station, however, at the lower end of District No. 2 from which the quantity of water flowing out of that district can be determined. No water flows out of either District 8 or District 2 except in the channel of the South Platte River. Exhibit A-86 shows the quantities of water reported by the water commissioner of District No. 8 as flowing out of his district, also the quantities reported by the water commissioner of District No. 2 as flowing into his district in the South Platte River, and a comparison with those reports of the actual gauge readings at Denver, for the same day or the nearest day, to the date of the water commissioner's report. July 3, 1909, the commissioner of District No. 8 reports 645 feet passing out of his district, on the same date the commissioner of District No. 2 reports 453 second feet entering his district. There was no gauge reading at Denver on the 3rd but on July 5, the gauge at Denver indicated 1930 second feet passing into District No. 2. The exhibit covers the period from 1909 to 1913 inclusive and the months of May, June, and July of 1914. The water commissioner of District No. 2 makes a report for every week in the year. The commissioner of District No. 8 for the irrigating season only. The exhibit deals only with the period for which there are simultaneous reports. The Denver gauge
1040 was in constant service throughout that period of years and constantly read and rated by employees of the State engineer's office. Except as indicated by the dates in parentheses the readings by the State engineer's office were on exactly the same dates as reported by the water commissioners. The water commissioner of District No. 2 receives information as to the quantity of water passing out of his district at the lower end from his deputy, who guesses at it. The statutes require, as do the forms of reports, that the water commissioners report the quantity of inflow from the tributaries in their district. There are no gauges where these streams flow into the Platte river, so the commissioners guess at them also. There are no devices in Districts 8 or 2 by which the seepage return can be measured. The commissioners fix the quantity of seepage at whatever may be necessary to balance their sheets. The commis-

sioner reports the amount of water entering his district in the main stream and through tributaries, the amount diverted by his ditches and the amount flowing out *if* his district. He needs something else to make up the quantity diverted plus what is going out, so he calls that seepage.

I do not consider that the actual diversion by the ditches is an indication of the real need of the ditch, or the land under it, in such cases as are presented in Districts 8 and 2 which are only partially developed districts. The total acreage irrigated in them has not exceeded 120,000 acres. I feel certain that the water of the Platte River handled either through reservoirs or directly out of the channel of the stream will ultimately be capable of irrigating satisfactorily double this acreage. The history of other districts has shown that that can be done.

I do not think it is proper to take the diversion of the ditches in District- 8 and 2 for the year 1913 as representing the actual needs for all the years in the future. I have stated that I do not believe the actual diversions are the real measure of the needs and I do not see how it is possible to select any one year and exclude all others unless that year be compared in all respects with the average of all the years of record. And if that comparison is made, that in itself indicates that the average of all of the years of record is the proper standard. The proper way to ascertain the needs for the future is to take a series of years and apply to each year the stream flow, tributary and seepage inflow, and the use, taking into consideration the precipitation, temperature, and all other things, that have a bearing on the problem. The years should be the longest period available. One cannot manufacture records of that kind, and if he cannot get a long series of years he must take what he can get. The flow in the tributary streams in Districts 8 and 2 is variable from year to year and frequently in the same year a large inflow from one
1041 stream is accompanied by a small inflow from a parallel tributary.

I have made no investigation to determine whether or not the year 1913 was a year of average stream flow in the Platte River and its tributaries supplying Districts 8 and 2, or in the accretions to the stream from seepage, or in precipitation, temperature, and diversion of water, by the various ditches.

In respect to the letters written by Mr. Cogswell, Division engineer of Irrigation Division No. 1, running from June 19, 1911, to Dec. 23, 1911, contained in Defendants' Exhibit No. 36 that were presented by Mr. Field. They were written while I was State engineer, at a time when the policy of the State engineer's office was to not recognize undecreed rights until after all decreed rights were satisfied, regardless of whether the decreed rights were of later date than the claim of the undecreed rights. At the time of this correspondence, neither Lake Cheesman nor the Antero Reservoir had decrees.

Under the rule of recognizing the decreed rights first, Lake Cheesman would not be permitted to store while any decreed rights were unsatisfied. The right of storage in a reservoir is regulated according to the conditions existing when the water available for

storage is at the reservoir, and not according to a theoretical condition that might exist along the stream when this water, as in the case of Lake Cheesman, might reach the headgates of any of the numerous ditches between Lake Cheesman and the Nebraska State line, where the South Platte River leaves the state. It takes about two days or more for the water from Lake Cheesman to flow down to the lower end of District No. 2, and from five or six days to flow down to the state line.

(Statement of method of measurement of stream flow at Lake Cheesman by consideration of gauge heights and discharge over spillway or through valves.) Because of the fact that there are tributary supplies to Lake Cheesman which cannot be measured, the final record is based upon the gauge heights, showing the elevation of water surface and the contents of the reservoir, checked against the discharge over the spillway or through the valves. This method of measurement includes in the results obtained whatever deduction there may be for loss due to evaporation or seepage, and in order to ascertain the exact flow of Lake Cheesman it would be necessary to add to this record whatever the loss from seepage and evaporation may be. In making my estimate of storage for Lake Cheesman on the basis of 70,000 acre-feet annual draft, I did not take into account the question of evaporation or seepage at all, because I considered that it would be necessary to add whatever evaporation might be estimated to the stream flow, which
1042 would add to the available storage, then I would deduct the evaporation again, getting back to the starting point, although as a matter of fact the ev-poration of Lake Cheesman operated as an irrigation reservoir, would be less than has been the case as Lake Cheesman has been operated in the past. In my original testimony concerning storage possibilities in Lake Cheesman, I used the stream flow of the South Platte River corrected for such storage as had occurred from June 24, 1908, up to the end of the year 1913. This data I obtained from the State engineer's office and was all the data there available. Prior to June 24, 1908, I used the actual daily record of stream flow as a basis for my storage estimate. Most of the storage that has been made in Lake Cheesman occurred prior to June 24, 1908. I could have obtained the data from which to correct the stream flow prior to June 24, 1908, from the water company, but up to the time that I gave my first testimony I had not gone to the water company's office or officers for any information whatever. The result is that my estimate of storage for the period prior to June 24, 1908, is an estimate of possible storage over and above that which actually took place in Lake Cheesman. Lake Cheesman was full, or practically so, in June, 1908. So my estimate of storage up to the middle of 1908 should be increased by the actual capacity of the reservoir distributed over that period. I did not take into consideration, either the quantity of water actually stored in Antero reservoir, as testified to by Mr. Wall, although that water was available for Lake Cheesman, or would have been had Cheesman been empty, or partly so.

Q. Mr. Comstock, various engineers have presented in this case

estimates relative to Lake Cheesman's possible and actual storages, which, according to their assumptions and estimates might be made there, and the results of the operations of the reservoir upon different assumed annual drafts. Mr. Field, for example, in his testimony and in his final exhibits Nos. 45 and 46, upon an assumed annual draft of 40,000 acre-feet, and for the twelve-year period 1902 to 1913; inclusive, showed an efficiency of the reservoir as follows: In eleven of the twelve years, 100 per cent, and in the other year, which was 1904, 81 per cent; also, according to his estimates of actual and possible storage and upon an assumed annual draft of 50,000 acre-feet, he showed for the reservoir an efficiency expressed in percentages as follows: For the period 1901 to 1913, a thirteen-year period, to-wit: Ten years, 100 per cent efficiency, and in the other three years the following efficiencies: In 1903, 61.5 per cent; in 1904, 45.9 per cent; in 1911, 89.71 per cent, thus arriving at an average efficiency on the 40,000 acre-foot draft and for the twelve-year period of 98.4 per cent, and an average per cent on the 50,000 acre-foot draft
1043 for the thirteen-year period of 92.08 per cent. I will ask you to state whether, in your judgment, there is a sufficient difference in the efficiency of the reservoir, as estimated by Mr. Field, as between the assumed draft of 40,000 acre-feet per annum and the assumed draft of 50,000 acre-feet per annum, to make any difference in the market price or value per acre-foot of water rights under the reservoir or in the reservoir?

A. No sir; I do not believe there would be any difference in the market value or in the market price.

Q. On this estimate of Mr. Field's, on the 40,000 acre-foot draft, he had at the end of each calendar year left in his reservoir the following percentages of his draft, estimated draft or assumed draft of 40,000 acre-feet: At the end of 1902, 91 per cent; 1903, 33 per cent; at the end of 1904, 10.9 per cent; 1905, 100.4 per cent; at the end of 1906, 168.6 per cent; 1907, 191.1 per cent; 1908, 102.2 per cent; 1909, 190.95 per cent; 1910, 121.24 per cent; 1911, 38.66 per cent; 1912, 124.16 per cent; 1913, 135.31 per cent, and at the same time out of the waters available for storage in the reservoir under the decreed appropriation it was necessary to allow to go to waste over the spillway the following percentages of the assumed annual draft of 40,000 acre-feet: in 1902 29.7; 1907, 62.39, equivalent to 24,957 acre-feet; in 1908, 9.44 per cent, equivalent to 3,775 acre-feet; in 1909, 93.76 per cent, equivalent to 37,505 acre-feet, and in 1910, 77.96 per cent, equivalent to 31,383 acre-feet. I will ask you to state whether, considering the quantities left in the reservoir at the end of each calendar year and the quantities necessarily wasted over the spillway on the operation of the reservoir on a 40,000 acre-foot draft, according to Mr. Field's estimate, such an annual draft of 40,000 acre-feet shows a proper and business-like method of operating that reservoir?

A. Do I understand that the percentages left in the reservoir were percentages of the annual draft?

Q. Percentage of the 40,000 acre-feet, yes sir.

A. I should say very emphatically that would not be a businesslike operation of the reservoir.

Q. Would or would not the reservoir—would or would it not be a businesslike procedure to operate it at a higher annual draft than 40,000 acre-feet under these conditions?

A. It certainly would, yes sir.

Q. Now, Mr. Fellows presented some estimates on a like subject and according to Mr. Fellows' estimates of possible and actual storages at Lake Cheesman, on an assumed annual draft of 40,000 acre-feet and for a period of fourteen irrigation seasons, beginning with the season of 1901, Mr. Fellows found that there would be efficiencies on the annual draft as follows: In twelve out of the
1044 fourteen years, 100 per cent; in one year, corresponding to 1903, 77.32 per cent, and in another year, corresponding to 1904, 61.88 per cent, making an average efficiency for the period of 95.6 per cent; Mr. Fellows also, upon his estimate of possible and actual storages at Lake Cheesman, determined what the result would be upon an annual draft of 50,000 acre-feet, those results being as follows: For this same fourteen-year period, ten years of the fourteen, 100 per cent efficiency; of the other four years, in a season corresponding to 1903, 27.8 per cent efficiency; in the season corresponding to 1904, 50.6 per cent, in the season corresponding to 1909, 98.2 per cent, in the season corresponding to 1911, 96.7 per cent, resulting in an average efficiency on the 50,000 acre-foot draft of 90.95 per cent. I will ask you to state whether, in your judgment, there is a sufficient difference in the efficiency, according to Mr. Fellows' estimates of the 40,000 acre-foot draft per annum and the 50,000 acre-foot draft per annum, to make any difference in the market price or value per acre-foot of the water rights?

A. No sir, there is not.

Q. In reading to you the percentages of the years which were less than 100 per cent, I think I read to you the percentages which we have computed. I will now read you the figures as given in Mr. Fellows' own exhibit, and I will ask you if that cause you to change your opinion in any way: On the 40,000 acre-foot draft, the percentages given by Mr. Fellows for the short years, were, 1903, 77 instead of 77.32; 1904, 62 instead of 61.88, and on the 50,000 acre-foot draft the percentages in the short years as given by Mr. Fellows in his Exhibit 44 were in 1903, instead of 27.8, 28 per cent; 1904, instead of 50.6, 51 per cent; 1909, instead of 98.2, 98 per cent; 1911, instead of 96.7, 97 per cent. Would that make any difference?

A. No sir.

Q. Now, Mr. Fellows shows, or his exhibit shows, that in operating the reservoir according to his estimated storage on the annual draft of 40,000 acre-feet, that he would have left in the reservoir at the end of each irrigation season, that is to say at the end of the month of October or November 1st, the following percentages of his assumed annual draft of 40,000 acre-feet, to-wit: At the end of the first season, 133.68 per cent; second season, 107.83 per cent; third season, 58.79 per cent; fourth season, no per cent; fifth season, 1.78 per cent, the fourth and fifth seasons corresponding with the years

1903 and 1904, sixth season, 64.90; seventh season, 89.93 per cent; eighth season, 177 per cent; ninth season, 92.24 per cent; tenth season 181.67 per cent; eleventh season, 107.83 per cent; twelfth season, 40.25 per cent; thirtenth season, 131 per cent; four-
1045 teenth season, 154 per cent, and then in addition to that, during that period of years there was necessarily wasted over the spillway out of the water available the following percentages of the assumed annual draft of 40,000 acre-feet, to-wit: First season, 15.75 per cent, equivalent to 6,305 acre-feet; second season, 23.04, equivalent to 9,359 acre feet; eighth, 25.9 per cent, equivalent to 10,360 acre feet; ninth season, 18.4 per cent, equivalent to 7,367 acre-feet; eleventh season, 118.8 per cent, equivalent to 47,516 acre-feet; fourteenth season, 4.5 per cent, equivalent to 1,825 acre-feet. I will ask you to state, Mr. Comstock, in view of the quantities of water left in the reservoir at the end of each irrigation season and the quantities necessarily wasted over the spillway, whatever the proportion, whether or not in your judgment the operation of that reservoir on Mr. Fellows' estimate of storage on an annual draft of 40,000 acre-feet, was a proper and businesslike method of operation, and a proper and businesslike draft on which to operate?

A. No sir.

Q. Why not?

A. Because of the large quantities of available water which get away for the sake of protecting two or three short years in fourteen. I do not think any man who utilizes water for the growing of crops expects that he will not have an occasional short year, whether he derives his water from an irrigation system or whether he depends on the railfall.

Q. You say every man has that expectation?

A. Every man I ever saw. I think it is probably universal among them.

Q. Then if I correctly get your meaning, you would say that the reservoir, if properly operated and operated in a businesslike way, should be operated at a higher draft than 40,000 acre-feet per annum?

A. Yes, sir, it should.

Q. Mr. Bull has presented in his exhibit 39 results of the operation according to his estimates of possible and actual storages upon various annual draft. Upon that annual draft of 40,000 acre-feet he shows an efficiency of 100 per cent in every year for a period of thirteen years, to-wit, 1901 to 1913. On a draft of 50,000 acre-feet his exhibit shows an efficiency of 100 per cent for the same period in ten years and an efficiency of less than 100 per cent in three years, as follows: One year, 57.98 per cent; one year, 70.38 per cent; one year, 82.99 per cent, producing an average for the period of thirteen years on a 50,000 acre-foot draft of 93.2 per cent. I will ask you to state whether or not in your judgment there is a sufficient difference in the efficiency as shown on Mr. Bull's estimates between the 40,000 acre-foot draft and the 50,000 acre-foot draft to produce any difference in the market price or value per acre-foot of the water right?

A. No sir, I think not.

1046 Q. Mr. Bull also made an estimate on possible and actual storages of the performance of the reservoir on a 60,000 acre-foot annual draft, which showed for the same period, 1901 to 1913, inclusive, an efficiency of 100 per cent for eight years out of the thirteen, and for the other five years, efficiencies as follows: In the year 1902, 95.2 per cent; 1903, 19.5 per cent; 1904, 58.6 per cent; in the year 1911, 42.9 per cent, and in the year 1913, 86.6 per cent, producing an average efficiency for the period of thirteen years of 84.8 per cent. I will ask you to state whether or not there is a sufficient difference in the efficiency between performances of the reservoir on Mr. Bull's estimate on an annual draft of 50,000 acre-feet and that of Mr. Bull's estimate on an annual draft of 60,000 acre-feet to make any difference in the price or market value per acre-foot of water rights?

A. I do not believe so.

Q. Now, Mr. George Anderson made estimates as to possible storages in Lake Cheesman and also as to the operation of the lake upon an assumed annual draft of 60,000 acre-feet. Mr. Bull figured out and presented in his exhibit what he considered to be the results of Mr. Anderson's figures and those showed for that same period of thirteen years, to-wit, 1901 to 1913, upon an annual draft of 60,000 acre-feet, efficiencies of 100 per cent in ten years out of the thirteen and in the other three years efficiencies as follows: In the year 1903, 27 per cent; in the year 1904, 59.2 per cent, and in the year 1911, 84.2 per cent, making an average efficiency for the period of thirteen years mentioned, on the 60,000 acre foot draft, according to Mr. Anderson's estimate as understood by Mr. Bull, of 90 per cent. I will ask you to state whether or not in your judgment there is a sufficient difference in efficiencies between the efficiency of the reservoir on Mr. Anderson's estimates on a 60,000 acre-foot draft as just given and the efficiency on Mr. Bull's estimate of a 50,000 acre foot draft as given to you a few moments ago, to make any difference in the price or market value per acre-foot of the water rights thereunder?

A. No sir, I do not hink so.

Cross-examination by Mr. Nye:

I am familiar with the use of seepage ditches in District No. 3 for catching and using the original water a second or third time. I know that the average distance of the irrigated areas in District No. 3 from the channel of the Poudre river is greater than the average distance of the irrigated areas from the channel of the Platte in Districts 8 and 2. One of the sources of accretion to the Platte is the sewage system of Denver. It is a perennial supply. I don't know that there is more truck gardening immediately adjoining the Platte river in Districts 8 and 2 than there is in the area irrigated

1047 by the Poudre river. I don't think it is true that the average size of the tracts farmed in the Platte valley is smaller than in the Poudre valley. I know there is a good deal of truck gardening under the Fulton Ditch and City ditch. I don't know about the

Brantner, Petersburg, or Brighton ditches. I presume that the quantity diverted by the Nevada and Last Chance ditches from 1909 to 1913 were within the limits of their decrees. The figures given for the duty of water in Exhibit A-79 are obtained by dividing the acreage irrigated into the total acre feet diverted. The report of the Division engineer, from which this information is compiled is made up from reports made to him.

The quantity of water diverted, given in Exhibit A-79 is the quantity diverted during the season through the measuring flumes of the various ditches. It includes such water as may be stored by farmers in small private reservoirs from their direct supply, for use later in the season, but excludes water diverted distinctly for storage, which may be measured subsequently if it is discharged from a reservoir through a natural stream channel and picked up by a ditch in the district.

If it is diverted for use in a storage reservoir and subsequently taken directly to the land, without going through the natural stream, it would not appear in the record. I have not taken into account any loss from seepage and evaporation in the case of water stored either in a small private reservoir or in a recognized storage reservoir. The small reservoir system is in general use in the northern part of the state. I do not recollect any instance in which it is in use in Districts 8 and 2, but I would not say that it is not. In preparing Exhibit A-80, which deals with the supply available in the Platte Canon Ditch, after deduction is made for the storage in Lake Cheesman, I first corrected the flow of the South Platte River in Platte Canon for the actual storage and discharge by Lake Cheesman so that the table represents the stream flow as though Lake Cheesman were not in existence. From this table I deducted my estimate of storage for Lake Cheesman, producing a set of tables representing the discharge of the South Platte river as it would have been were Lake Cheesman operated as an irrigation reservoir, filling and emptying from year to year in accordance with my estimate of storage and draft. In these tables I limited Lake Cheesman to one filling to capacity a year, regardless of the quantity of water that might have been available for storage, instead of allowing it more than one filling as I did in my former Exhibit A-54. After preparing the table showing the stream conditions with Lake Cheesman operated as an irrigation reservoir, I compared the modified discharge in the winter months with the decree of the Platte
1048 Canon ditch, and during the irrigation months took into account the rights which were prior to the Platte Canon ditch. I used the months from May to October inclusive as the irrigation season. In the months from January to April and November and December, I considered that the Platte Canon Ditch might divert all the water available up to 56 second feet, and regarded as a shortage whatever deficiency there might be below 56 second feet. In the months May to October I found that 129 second feet must be flowing in the stream in order to supply the Platte Canon ditch with 56 second feet and regarded as shortage whatever deficiency there might be below the 129 second feet, up to a shortage of 56 second feet, which is all that the Platte Canon ditch could

be short. This 129 second feet is made up as follows: City Ditch 30 feet, Nevada Ditch 28 feet, Petersburg ditch 7.6 feet, Platte valley ditch 4.4 second feet, Brown ditch 3.3 second feet, Platte Canon Ditch 56 second feet, total 129.3 second feet. I am not certain that all that water must come out of Platte Canon, because the Petersburg, Platte valley and Brown ditches are located pretty well down stream, and partly supplied from accretions. However, I took 129 second feet, in round numbers as my factor. I did not take into consideration any ditches having prior rights in districts except District No. 8. I do not know that the total appropriation earlier than the Platte Canon Ditch including other districts are approximately 350 second feet. Using the factor 56 second feet in the months from November to April, and the 129 second feet in the months from May to November, I determined from the stream flow what is available for the Platte Canon ditch. Wherever blanks occur in the table it indicates that there is no record. This process is gone through from day to day on each day for which there is a record. From the final results at the end of each year the percentage of shortage is obtained through a computation, using the mean shortage for the year against the total decree of the ditch. Out of the total periods shown in Exhibit A-80 there are only three years with a record for every day in the year, and one other year with a record for eleven full months.

Exhibits A-87-*a*. Discharge of the South Platte river at South Platte corrected for storage at Lake Cheesman, A-87-*b*, discharge of South Platte river at South Platte after deducting estimated storage of Lake Cheesman and A-87-*c* shortage of supply for Platte Canon Ditch, are tables showing the details from which the summarized tables, Exhibits A-80 and A-81 are prepared. Exhibit A-81 is a summary of the tables in A-87-*b* reduced from cubic feet per second to acre feet. It is intended to show the quantity of water
1049 available for rights prior to Lake Cheesman after taking out the storage estimated and the distribution of that water throughout the year. I did not make any assumptions as to the division of that water between priorities. My former Exhibit A-52 in connection with the oral testimony given concerning it, contains a list of the several ditches showing the decrees, diversions, etc.

In arriving at the demand on the stream at the canon I fixed upon 75,000 acre feet as the amount necessary to be supplied to District No. 8 and upon 30,000 acre feet as the amount to pass Denver to supply the upper portion of District No. 2. In arriving at the first quantity, 75,000 acre feet, I was guided by several things, chiefly, I think, by a consideration of the consumption of water as shown by the difference, between the quantities passing the guaging stations at South Platte and at Denver. In fixing the quantity necessary to supply upper District No. 2, I considered the acreage to be supplied, assigned 2 acre feet of water to each acre and then made an estimate of the required amount of water which might be supplied by seepage and tributary inflow in upper District No. 2, the balance of which I concluded to be 30,000 acre feet I considered must pass Denver. And since I had concluded that 75,000 acre feet would be con-

sumed in District No. 8, I took the sum of the 75,000 and the 30,000 acre feet as the total amount of water which must come from Platte Canon. Only the quantity of water estimated as required for District No. 2 would be affected by an estimate of duty. Exhibit A-81 shows an average annual run-off over and above storage of 187,000 acre feet discharged at Platte Canon, which for the 120,000 acres maximum area irrigated in Districts 2 and 8, would give 1.56 second feet per acre. It shows a run-off discharged at the canon during the irrigating season from May to October inclusive, of 144,000 acre feet, or for the 120,000 acres, maximum area irrigated in Districts 2 and 8, 1.2 acre feet per acre. I made the computation on a total annual run-off merely for the purpose of comparison with the results obtained by Mr. Field on the Poudre river, where he took the entire discharge from the canon during the twelve months, divided it by the acreage irrigated and reached in that case a figure of 1.35 acre feet per acre.

In the preparation of this exhibit I was not considering the distribution of the water at all, the one thing that I wanted to bring out was a comparison of the two districts. My idea was, that what can be done in one district could be done in other, and if with all if the irregularities of discharge which are common to the Poudre and the Platte, a total supply in the course of a year of 1.35 acre feet per acre is adequate in the Poudre, I didn't see any reason why such a total supply of the same or slightly greater amount,
1050 in the course of the year would not be adequate in the Platte Valley. It was that comparison and nothing else that I had in mind.

Exhibit A-83 is simply a table of the mean monthly discharges of the South Platte river at South Platte or Platte Canon, expressed in cubic feet per second for such months as there are records. They are the actual discharges shown by the record, uncorrected for any actual storage and unaltered for any possible storage. It was not constructed particularly for comparison with Mr. Fellows' Exhibit 44, but in connection with a study of that and Mr. Field's Exhibits also. I did not construct a table showing the extent to which the actual flows at the canon were short of Mr. Fellows' estimated capacity, nor did I make a study of the records of the State engineer's office to ascertain whether in some of those months there was a shortage in the actual demand upon the stream. It is possible that in some of those months, in some of those years, the supply at the canon was insufficient for the actual demand. It is true that had Lake Cheesman not been constructed there would have been no such evaporation from the South Platte river at that place. The loss in evaporation is due to the fact that the D. U. W. Co. has constructed that lake and created the body of water from which such evaporation takes place. The method of stream measurement in use at Lake Cheesman is as nearly a correct record of what goes on at the Lake as it is possible to make. I have spent quite a little time worrying over that too. As State engineer I undertook to devise a means of determining the evaporation from the lake, or of charging the reservoir with the amount lost by evaporation, but did not establish one.

I do not think there has been such a method in the State engineer's office.

In Exhibit A-84, being the first hydrograph introduced, the yellow line indicates the requirements by rights prior to Lake Cheesman in Districts 8 and 2, acording to my estimates of the use as previously described, in connection with my determination of demand upon the canon. The requirements of the decrees representing districts 8 and 2 prior in time to Lake Cheesman would furnish a different line which would be above the yellow line as shown here. In plotting the yellow line I estimated the distribution on a percentage basis, as follows: May 15%, June 25%, July 25%, August 20%, September 10%, October 5%. I don't remember that these are the same percentages that were used by Mr. Anderson in his distribution of the irrigation supply. I made a separate determination and if I arrived at the same figures it is a coincidence. I did not attempt to assign any particular supply to any particular ditch. I had previously determined that 105,000 acre feet for the six months period, would be an adequate supply for these prior rights. I dis-
1051 tributed the 105,000 acre-feet through these six months in accordance with the percentages without regard to what ditch gets the water and what ditch does not. Using the decreed priorities as the factor would give a horizontal line stretching over the twelve months in the year, somewhere near the top of the hydrograph. I did not assign any water for irrigation in the month of April though ditches take water in that month in small quantities. I also closed the irrigation season on the first day of November, each year.

For the month of June, 1911, the hydrograph, Exhibit A-84 indicates the same storage that was indicated in the exhibits presented in my original testimony. I don't remember that in that month the High Line Ditch received only 500 acre feet and the Burlington Ditch no water at all, but if true I don't think those are determining factors, because if there is an adequate supply of water for the irrigation of all the lands, and if is wasted by some ditches and others are deprived of it, I don't think that the fact that some of the junior ditches are without water is justification for putting a limitation on other juniors. Furthermore, there have frequently been periods when the Burlington did not get water and did not want it. It cannot be assigned that because the Burlington Ditch does not get the full amount of its decree or does not get any water at all, that it is short in the sense that its needs are not satisfied. That is not equally true of the High Line, but true to some extent. The amount of water received by the High Line is not a criterion or proper measure of storability of water in Lake Cheesman. The only new matter shown by the hydrograph that was not shown in connection with my original testimony is in Exhibit A-85, showing the quantity of water left in the river after taking out my estimate of storage. The other data was put on for use in connection with that one thing. The two hydrographs are really one exhibit, but I found that they would be so badly confused if I put all the information on one sheet that I separated them to avoid confusion.

It would have been better if they could have been put on one sheet

without confusion. The horizontal scale is the same in both, so they can be easily read by placing one on top of the other and allowing for the difference in the vertical scale. In Exhibit A-85, where the red line drops below the yellow line it indicates that the quantity of water in the river is not sufficient to meet the requirements indicated by the yellow line. That occurs in the month of July, 1913. In the month of June of that year the hydrograph indicates that there was enough water left in the river to satisfy those demands after the discharge had been reduced by deducting for estimated stor-
1052 age. The yellow line on A-85 represents the same quantities as the yellow line on A-84, but it is drawn to different scale.

Exhibit A-86 showing the quantities of water reported as passing from District 8 to District 2 by the water commissioners of the two districts and by the gauge record shows a difference between the three sets of figures all through the exhibit. The information is all supposed to be taken from the same gauge. That is where the State engineer's office gets its information and that is where the water commissioners should get theirs. The stream varies at different hours of the day, but the gauge is an automatic recording gauge and the chart contains a record continuously of the variation.

Reading the gauge at different hours of the day and taking the readings at the hour read might account for a difference between the figures. The state engineer's office takes the record for the entire day and averages it. I did not make any effort to average the reports of the commissioners of the two districts and the State engineer's office. It would not surprise me to learn that the averages are very close together taking it through the entire period, nor would it surprise me to know that the water commissioner in District No. 2 averaging the several years covered by the exhibit, reports more water coming into his district than is reported out by district No. 8. I do not imagine that the commissioner of district No. 8 would report less water going out of his district than was going out, if he knew it. Or that the commissioner of Water District No. 2 would charge himself with more water than was actually coming in, if he knew the facts. These reports of the water commissioners are used by the State engineer's office and relied upon to the extent that thy must be for the lack of more accurate information. They are not regarded, as far as my experience goes, by either the division engineer or the state engineer as entirely trustworthy. But they are the best evidence that we have. That includes the record as to what ditches are and what ditches are not diverting water.

I stated that taking a single recent year as a basis for determining the use of water for the future was an improper method. If "A recent average year," such as you suggest could be found that compares in all respects with past experience, that might be proper, but that recent year must first be determined to be a fair average as compared with the past for a longer period. Which resolves itself back to the proposition that you should take the average for the longest possible period, rather than a fair sample of a recent year, assuming that a fair sample can be determined. It is not true that during

my term as state engineer that I gave Lake Cheesman prefer-
1053 ence on account of its being used as a domestic supply. I frequently said that I would give it the preference if the Lake was nearly empty, and there was danger of a shortage, but that occasion never arose. I have never operated a reservoir for either irrigation or domestic purposes, or bought or sold water rights in a storage system. I based my statements made in the discussion of the difference between the efficiency of the reservoir on different drafts on knowldge acquired from contact with irrigators. I think every purchaser of a water right and every user knows that whatever the source of supply may be, and whatever right he may have purchased, there will be times when he won't get as much water as at others and that whatever proportion of supply he may have purchased, it will yield less sometimes than others.

An irrigator would know if he only got 28 per cent of supply in one year and 51 per cent in the next. But in view of the fact that the shortage that produced that situation was known to affect practically every other supply in the same neighborhood, I don't think it would affect the market price of the water. I stated that in my judgment, on account of the water held over from year to year, and the wastage indicated in the estimates of Messrs. Fields and Fellows, that operation of Lake Cheesman on a basis of a 40,000 acre-foot draft would be unbusinesslike because there was too much wastage to protect two or three short years. I cannot answer, as an abstract question, whether it would be justifiable to increase the draft on that reservoir 50 per cent, or to 60,000 acre feet. It would be necessary for me to go into the results obtained under the 60,000 acre-foot draft. Lake Cheesman has never been operated as an irrigation reservoir. Its operation as such on a draft of 40, 50 or 60 thousand acre-feet would very materially change the condition of things on the river, as they have existed ever since Lake Cheesman was constructed. It is true that some of the water, that it is estimated is capable of being used for storage in Lake Cheesman, has in the past been used more or less by appropriators junior to Lake Cheesman. I do not know that the United States Weather Bureau regards the records of the Loveland station as inaccurate, they did not so advise me. I know that the present station is at Boothroyd's ranch, and there is now no station at Loveland. I assume that it was the intent of the law, requiring waste gates and waste ways on ditches, to bring about the return to the stream of excess water diverted with as little loss as possible.

1054 Redirect examination by Mr. Dorsey:

In respect to the seepage ditches about which I was asked, in District No. 3, they are really drainage ditches constructed below certain irrigated lands to pick up the excess water and carry it to other lands. The practice is common in all parts of the state and not confined to District No. 3. I cannot give any idea of the quantity of water so caught and distributed, but it would be a small percentage of the total supply.

The figures set forth in Exhibit A-79 include all water actually

diverted from the stream, except that diverted to recognized storage reservoirs. As to this matter, the figures of diversion only include that which has been stored in such reservoirs and subsequently returned to the natural stream, and then diverted by ditches as stored water for irrigation. In district No. 3 there are storage reservoirs having an aggregate capacity of about 150,000 acre-feet. About half of the water diverted by them, and not included in the diversion figures in A-79, is applied to land without again getting to the natural stream. Therefore, is not ac-ounted for in this exhibit. In order to get the actual duty of the water in District No. 3 it would be necessary to add that one-half of these reservoirs to the total quantity of the water used in the district thus increasing the duty about 3-10 of an acre foot per acre. In enumerating the ditches prior to the Platte Canon Ditch, that I considered in arriving at my requirements of 129 second feet during the irrigation season before the Platte Canon ditch could draw its full appropriation, I omitted the Epperson or Green Valley ditch which is located within the City of Denver, 20 miles from Platte Canon, has a decree for 2.25 second feet and is supplied by inflow below the canon creating no demand on the canon. There are also the Brantner and the Farmers and Gardners ditch ahead of the first priority of the Platte Canon and the Platte valley, Farmers and Gardners, Brantner, Lupton Bottom and Brighton ditches with priorities subsequent to the first priority of the Platte Canon and earlier than the second. With the possible exception of the Farmers and Gardners, they are all in District No. 2. Prior to 1912 the Farmers and Gardners, took water between 18th and 19th Streets. It now takes water right at the Tramway Company's power house. I am not certain whether it is in District 2 or 8 now. Its original location was in District No. 2. The Dugan Ditch in District No. 2 has a priority between the second and third appropriations of the Platte Canon Ditch. I believe that its water has been transferred to the Burlington. I did not consider any of these ditches in estimating my demand on the canon, be-
1055 cause, I considered that accretions to the stream in Districts 8 and 2, were adequate to supply their needs.

No charge has ever been made against Lake Cheesman for loss of water due to evaporation. The measurements of inflow and outflow at Lake Cheesman are based upon the readings of actual gauges and measuring devices. The reports of water commissioners as to the needs for water in his district, are not based upon any measuring devices, but upon his own judgment, or the judgment of the ditch superintendent. The yellow line on the hydrographs A-84 and A-85, expresses the demand estimated by me upon Platte Canon for irrigation water in Districts 2 and 8 in cubic feet per second. It is true that that demand is not as great as indicated by the decrees of the ditches in those districts. I do not know of any ditch in Districts 2 and 8, or anywhere which has a direct flow right and is used for irrigation purposes which constantly and at all times draws water to the full quantity specified in its decree. Objection overruled. Exception.

If all the ditches in Districts 2 and 8, prior in point of time to

Lake Cheesman, constantly drew water to the limit of their decrees, there never has been sufficient water at Platte Canon to satisfy them. And if they did so draw water, all of it would not have to be supplied from Platte Canon. In respect to the discrepancies shown between the reports of water commissioners of Districts 8 and 2 and the gauge at the Denver gauging station, as set forth in Exhibit A-86, it is not likely that they would be accounted for by the difference in time of the gauge readings by the different individuals. On most days there is not enough variation in the stream to make that possible. On occasional days there might be abrupt changes sufficient to account for such discrepancies. The gauge record made by the state engineer's office is the average flow for the day, as shown by the gauge. It is the understanding of the division engineer and the state engineer that the water commissioner's reports also set forth the average flow for the day. I stated that, in my judgment, greater experience in the use of water for irrigation was developing a skill in that regard, on the part of irrigators, that was gradually increasing the economy in the application of water, and that that economy would be likely increased in future years. I believe that taking into consideration the unscientific and uneconomical use of water, which has occurred in the past, that the method that I adopted in arriving at the amount of water required for irrigation in the future took into consideration every possible need, and that such a method of forecasting is much more accurate than one based upon conditions existing in any one year. Taking into consideration the ad-
1056 vance in the science in irrigation in the past, we may reasonably expect in the future to reduce the quantity of water estimated to be required.

In estimating the storage for Lake Cheesman it is assumed that the total estimated draft has been made upon the reservoir each year. In actual practice that draft does not occur, each year, because the consumers draw only such water as they need. That need varies from year to year. In my estimates of the storage capacity of Lake Cheesman I think I have taken into consideration all of the changes in conditions on the river, which would be brought about by the operation of Lake Cheesman by the method I have assumed.

Recross-examination by Mr. Nye:

Referring to the 75,000 acre feet of stored water in District No. 3 which was not included in the table of diversions in Exhibit A-79 and which I said should be included, there should be no consideration of the question of seepage and evaporation in connection with that quantity. Such loss would effect the portion of that water that would ultimately reach the land, but the loss should not be applied to reduce the amount of the actual diversion. There is such a loss in the case of all water diverted from the stream.

When for the purpose of computing the demand for water for irrigation in Districts 8 and 2, I considered the average demand rather than the decrees for the district, I knew and had in mind the fact that the Platte Canon ditch, with a decree for irrigation purposes only, was drawing water practically every day in the year at a rate

which would make the duty if applied upon lands under the ditch, very much lower than the duty assumed by me for other ditches. The record charts of the gauge at the Denver gauging station are removed by the state engineer's office, once a week. There is no reason, however, why the charts cannot be accurately read while it is attached to the gauge and without interference with its operation. Ordinarily a single glance at the gauge would be sufficient even for an untrained man. I don't think either of the water commissioners of District 8 and 2, saw that gauge once a month. I don't think their reports came very near the results of the state engineer, based on the gauge readings. Nearly every reservoir is operated on the basis of an assumed draft for the irrigation season. That assumed draft being the capacity of the reservoir. The reservoirs in Colorado are sold, or offered for sale, up to the limit of their capacities and they may be drawn upon to that extent if the water is demanded.

1057 Witness ALFRED A. EDWARDS.

Direct examination by Mr. Dorsey:

Q. At the time you formerly testified, I think you gave at some length your experience in irrigation matters and I will not ask you to repeat that now, but will ask you whether such experience in connection with irrigation matters has made you familiar with the operation of reservoirs for irrigation purposes and with the efficiency of such reservoirs?

A. It has.

Q. Various witnesses in this case, Mr. Edwards, have given testimony relative to the possible storages which might be made at Lake Cheesman under its decreed appropriation, and upon these estimates of possible storages have likewise presented their theories of the proper annual draft to be placed upon the reservoir in selling water rights under it. I desire to ask you a few questions on that subject. Mr. John Field testified and also showed by his Exhibits 45 and 46 that according to his estimates of possible and actual storages in Lake Cheesman and upon an assumed annual draft from the reservoir of 40,000 acre-feet, the performance of the reservoir for the period of eleven or twelve years, 1902 to 1913, inclusive, would be as follows: That in eleven of those years the reservoir would furnish the full quota of 40,000 acre-feet, thus showing an efficiency of 100 per cent, and in one of these years, to-wit, the year 1904, would furnish 81 per cent of 40,000 acre-feet; likewise Mr. Field, upon his estimates of pos-ible storages at Lake Cheesman, and upon an assumed annual draft of 50,000 acre-feet, showed a performance of the reservoir in point of efficiency as follows: For the years 1901 to the year 1913, inclusive, a period of thirteen years, in ten of those years 100 per cent efficiency—that is, a delivery of the full 50,000 acre-feet, and in the other three years efficiencies as follows: In the year 1903, 61.5 per cent; in the year 1904, 45.9 per cent, and in the year 1911, 89.71 per cent, the average efficiency for the period of twelve years of the 40,000 acre foot draft being 98.4 per cent, made

up as I have described, and the average efficiency on the 50,000 acre-foot draft being 92.08 per cent, made up in the manner I have described. I ask you to state, Mr. Edwards, whether or not there is a sufficient difference upon the efficiency of the reservoir between those two assumed drafts to make any difference in the price per acre-foot of the water rights in the reservoir?

A. I do not think it would make any difference in the price.

Q. I also call your attention to the fact that under Mr. Field's estimates of possible and actual storages, and upon his assumed draft of 40,000 acre-feet, he had left in the reservoir at the end of each calendar year the following percentages of the quantity
1058 which he had assumed as his annual draft, that is the following percentage of 40,000 acre-feet, to-wit: At the end of 1902, 91 per cent; 1903, 33 per cent; 1904, 10.9 per cent; 1905, 100.0 per cent; 1906, 168.6 per cent; 1907, 191.1 per cent; 1908, 102.3 per cent; 1909, 190.95 per cent; 1910, 121.24 per cent; 1911, 38.66 per cent; 1912, 124.16 per cent; 1913, 135.31 per cent, and that in addition thereto in the operation of the reservoir on the 40,000 acre-foot draft only, he was obliged to waste out of the water otherwise available under the reservoir's decreed appropriation and allow to flow away over the spillway, the following quantities in percentage of 40,000 acre-feet, to-wit: In 1902, 29.7; 1907, 62.39, equivalent to 24,957 acre-feet; in 1908, 9.44 per cent, equivalent to 3,775 acre-feet; in 1909, 93.76 per cent, equivalent to 37,505 acre-feet, and in 1910, 77.96 per cent equivalent to 31,183 acre-feet, which he lost over the spillway. Please state, Mr. Edwards, whether, in your judgment, in view of the quantities left in the reservoir at the end of each calendar year and in view of the wastage over the spillway necessitated by the operation of the reservoir on an annual draft of 40,000 acre-feet, it was a proper and economical annual draft at which to operate the reservoir or should the annual draft have been greater.

A. I think the annual draft should have been greater to be economical.

Q. And in proper reservoir practice and operation under the conditions I have described, would the draft have been greater from that reservoir?

A. It would.

Q. When I use the word "proper" I mean business-like; if I substitute the word business-like for proper, would or not your answer be the same.

A. It would be the same.

Q. Mr. Fellows also made like estimates which he presented in testimony and by his Exhibit 44, in the estimate which Mr. Fellows made of the actual and possible storage in Lake Cheesman under its priorities and upon the assumption of a draft each year of 40,000 acre-feet form the reservoir, he arrived at percentages of efficiency for a fourteen-year period beginning with 1900, as follows: In twelve years out of fourteen, 100 per cent efficiency; in the other two, in one year, corresponding to the year 1903, an efficiency of 77.32 per cent, and in the other year, corresponding to the year 1904, an efficiency

of 61.88 per cent, making an average efficiency for the fourteen years of 95.6 per cent. Mr. Fellows made a like estimate according to his estimate of possible and actual storages at Lake Cheesman, and upon an assumed draft of 50,000 acre-feet annually from the reservoir, under which he shows an efficiency as follows on the 50,000 acre-draft in ten years out of the fourteen he got an efficiency of performance of 100 per cent and in the other four years
1059 he produced an efficiency, according to his figures, in the year 1903 of 28 per cent, in the year 1904 of 51 per cent, in the year 1909, 98 per cent, and in the year 1911 of 97 per cent, making an average efficiency for the whole period on the 50,000 acre-foot draft of 90.95 per cent. I will ask you to state, Mr. Edwards, whether in your judgment there is a sufficient difference between the efficiencies according to Mr. Fellows' estimate on the 40,000 acre-foot draft and the 50,000 acre-foot draft to make any difference in the market price or value per acre-foot of the water rights in the reservoir?

A. I think not.

Q. I also call your attention, Mr. Edwards, to these facts in respect to the 40,000 acre-foot draft assumption of Mr. Fellows, that at the end of the irrigation season, that is, at the end of October in each year and at the beginning of November in each year, he had left in his reservoir the following percentages of his assumed draft of 40,000 acre-feet, namely, at the end of the first season, 133.68 per cent; second season, 107.83 per cent; third season, 58.79 per cent; fourth season, nothing left in the reservoir; fifth season, 1.78 per cent, the fourth and fifth seasons being 1903 and 1904; sixth season, 64.90 per cent; seventh season, 89.93 per cent; eighth season, 177 per cent; ninth season, 92.24 per cent; tenth season, 181.67 per cent; eleventh season, 107.83 per cent; twelfth season, 40.25 per cent; thirteenth season, 131 per cent; fourteenth season, 154 per cent, and at the same time, out of the water available from the decreed appropriation of the reservoir he was obliged to let go over the spillway and otherwise waste the following percentages of his assumed draft of 40,000 acre-feet, to-wit: The first year, 157.5 per cent, equivalent to 63,005 acre-feet; the second year 23.4 per cent, equivalent to 9,359 acre-feet; in the eighth year, 25.9 per cent, equivalent to 10,360 acre-feet; the ninth year, 18.4 per cent, equivalent to 7367 acre-feet; the eleventh year, 118.8 per cent, equivalent to 47,516 acre-feet, and in the fourteenth year, 4.5 per cent, equivalent to 1,825 acre-feet.

I will ask you to state, Mr. Edwards, whether, considering the quantities of water left in the reservoir at the end of each irrigation season and the quantities which the reservoir, upon these assumptions, was obliged to lose out of its appropriation by permitting it to flow away over the spillway, the operation of that reservoir on the assumed annual draft of 40,000 acre-feet was in your judgment a proper and businesslike method of operating it?

A. I would not consider that it was.

Q. Ought it, in your judgment, to be operated upon an annual draft larger than 40,000 acre-feet under those conditions?

A. I think it ought to be, yes, sir.

1060 Q. Another witness on this subject was Mr. Bull, who presented estimates relative to possible and actual storages at Lake Cheesman and the results of its operation on various assumed annual drafts, which are set forth in his Exhibit No. 39. According to Mr. Bull's estimates of possible and actual storages at Lake Cheesman and upon an assumed annual draft of 40,000 acre-feet, he showed an efficiency for the reservoir of 100 per cent for each year of a period of thirteen years from 1901 to 1913, inclusive, at the same time wasting considerable water over the spillway; and on an assumed annual draft of 50,000 acre-feet for the same period of thirteen years, he showed ten years of 100 per cent efficiency, one year of 57.98 per cent, one year of 70.38 per cent, and one year of 82.99 per cent, making an average efficiency upon the 50,000 acre-foot draft of 93.2 per cent, made up as I have described. I ask you to state whether there is sufficient difference in the efficiency, according to Mr. Bull's estimates on the 40,000 acre-foot draft and the 50,000 acre-foot draft, to make any difference in the price or value per acre-foot of water rights in the reservoir?

A. I think not.

Q. Mr. Bull also made an estimate for the same period of thirteen years—that is, 1901 to 1913, inclusive—on an assumed annual draft from the reservoir of 60,000 acre-feet, and showed upon that assumed draft an efficiency for the reservoir of 100 per cent in eight years out of the thirteen, and an efficiency in the other five years as follows: In the year 1902, 95.2 per cent; in the year 1903, 19.5 per cent; in the year 1904, 58.6 per cent; in the year 1911, 42.9 per cent; and in the year 1913, 86.6 per cent, making an average efficiency for that period of thirteen years of 84.8 per cent, the lowest percentage being that of 1903 caused by the shortage of 1902. Is there, in your judgment, enough difference in the efficiency, according to Mr. Bull's estimates on the 60,000 acre-foot draft and the 50,000 acre-foot draft, to make any difference in the market price per acre-foot of water rights in the reservoir?

A. I think not.

Q. Mr. Anderson also made certain estimates—Mr. George Anderson—and upon those estimates showed the results of operation of the reservoir on an assumed annual draft of 60,000 acre-feet, and, as figured by Mr. Bull, according to Mr. Anderson's estimates, the efficiency of the reservoir for the thirteen-year period 1901 to 1913, would have been as follows: In ten years out of the thirteen the efficiency would have been 100 per cent, and in the other three years the efficiency would have been as follows: In the year 1903, 27 per cent; in the year 1904, 59.2 per cent; and in the year 1911, 84.2 per cent. I should have said there were ten years of 100 per cent

1061 efficiency, and the other three years as I have described; the lowest being that of 1903, caused by the abnormally small supply of 1902, all resulting in an average efficiency of 90 per cent. I will ask you to state whether there is enough difference in efficiency of the reservoir on Mr. Bull's estimate of 40,000 acre-feet, his estimate of 50,000 acre-feet annual draft, and Mr. Anderson's esti-

mate of 60,000 acre-foot annual draft, to make any difference in the price per acre-foot of water rights in the reservoir?

A. What were the averages?

Q. The averages were: Mr. Anderson, on the 60,000 acre-foot draft, 90 per cent; Mr. Bull, on a 50,000 acre-foot draft 93.2 per cent; Mr. Bull, on a 40,000 acre-foot draft, 100 per cent.

A. I think not.

Cross-examination by Mr. Nye:

The efficiency of a reservoir to supply the water which it is expected to supply has a bearing upon the value of that supply. I don't believe that under the average percentages obtained here there would be any difference in the market value. If the efficiency dropped below 50% it would decrease the value and there might be some decrease above that percentage, but as I understand it all owners of reservoir rights except short years below 100% and from my experience that has not been the cause for depreciation in market value. Most of my experience has been with reservoirs owned by mutual companies, where each share of stock participated in all of the water of the company from every source. The original owners having participated in the expense of production of the reservoir. I would base an estimate of the value of direct flow rights upon the same consideration of efficiency as reservoir rights.

Redirect examination by Mr. Dorsey:

The efficiency of a direct flow right as bearing upon its value, would depend upon the period in the irrigation season when water was available under it. If you could only get water very early in the season it would have a considerable effect on the value of each acre-foot diverted.

Recross-examination by Mr. Nye:

The efficiency of any water right for irrigation purposes must be measured in connection with the purpose for which that right is used, namely, to grow and mature crops with.

1062 Witness GEORGE G. ANDERSON.

Direct examination by Mr. Dorsey:

Exhibit A-88 is a tabulation comparing the estimates of storage in Lake Cheesman as shown by the testimony of the several witnesses who have testified upon that subject in this case: Messrs. Field, Fellows, Bull, Comstock, and myself. The exhibit covers the years from 1901 to 1913 inclusive. The estimates being set forth, month by month, in columns devoted to each witness. In the last column are notes referring to rainfall, stream flow, and other conditions affecting Districts 8 and 2.

The rainfall data is taken from United States Weather Bureau records. The stream flow from the records of the state engineer, or the records of The D. U. W. Co. at Lake Cheesman. Notes as to particular conditions in the districts are from the reports of the

water commissioners. The first column of the exhibit gives data of the actual storage that occurred at Lake Cheesman during the years it has been in existence. Notes occurring on the different pages and in the different columns call attention to minor discrepencies between the exhibits of different witnesses, or to the treatment of corrections in the figures of the different witnesses, based upon testimony given by them on the witness stand.

The notes at the end of the year 1911 refer to the fact that in that year 11,000 acre feet of water was stored in Antero reservoir, and the note at the end of the year 1912, to the fact that reservoirs in District No. 2 stored a total of 91,000 acre feet according to the reports of the water commissioner after the month of April. The only reservoir in District No. 2 prior to Lake Cheesman is Barr Lake with a right to 11,000 acre feet, which usually is filled during the winter from November to April. The last sheet of the exhibit summarizes the estimates of storage for the several years, by the several witnesses. Set out first to indicate the total gross storage possible in the reservoir and immediately below that the storage possible, limited by the capacity of the reservoir to 79,064 acre-feet during any year. Blank spaces indicate that no estimates were made by the particular witness for the year or period where the blank occurred. In considering the results obtained by the other witnesses I have added on this summary sheet, full capacity storage for the years 1900 and 1914, in the case of the witnesses who submitted no estimates on these years, and compared the results with those years added in the cases of the other witnesses with the results obtained by me from a consideration of those years. Offered and ad-
1063 mitted. Referring to the forecasts of demand for irrigation water at Platte Canon, made by Mr. Fellows, on the basis of the demand for the year 1913, and by Mr. Field based upon a consideration of the years 1912 and 1913, I don't believe that fair and accurate judgment is possible from the experience of one season alone or from the average of two seasons. There are so many factors to be taken into consideration that have a controlling effect upon the demands for water; weather conditions, rainfall, and the rate of volume of flow, being most important. Another material element is the wide fluctuation from season to season in the accretions to the river below the canon from tributary streams and seepage. Mr. Fellows treated his estimated demand on the canon in acre-feet for each month and applied his demand in such a way that Lake Cheesman was not permitted to store unless the flow of the river at the canon for that month had aggregated a quantity in excess of the demand.

This would tend to an unjust effect, because during part of the month a greater volume than needed might be available and storage permitted, though a decreased flow for the remainder of the month reduced the total flow so that under that rule no storage could be had. The flow of the river varies largely from day to day. I am of the opinion that such a rule would have operated to prevent legitimate storage in quite a number of cases where peak floods occurred in the stream. Taking the requirements set forth by Mr. Field as to flow

at the canon before Lake Cheesman can store and comparing them with the facts of actual storage that occurred in the year 1912, gives an indication of the operations of that rule. In the month of April Mr. Field estimated 4,884 acre feet for Lake Cheesman in that month. There was actually stored in Lake Cheesman that month, according to his exhibit 47, 7,425 acre feet. The total stream flow at Lake Cheesman during April was 8,019 acre feet as shown by Mr. Fellows' exhibit 44. There was stored in District No. 2 during the month 6,370 feet and in Antero reservoir in March and April, 2,400 acre feet, one-half of which may be fairly estimated as storage for April. Under these conditions Lake Cheesman could have stored all of the stream flow, 8,019 acre feet; plus 1,200 feet stored at Antero or a total of 9,219 acre feet, an excess of 4,385 over Mr. Field's estimate. In May Mr. Field estimates 7,328 acre feet, there was actually stsored according to Exhibit 47, 10,968 acre feet. The total stream flow at Cheesman in May was 11,600 acre feet, according to Exhibit 44. There was stored in District 2 in that month, 10,500 acre feet, therefore, all of the stream flow at Cheesman could have been stored.

There was stored in Antero that month 1,800 acre feet, which
1064 plus stream flow at Lake Cheesman makes a total of 13,400 acre feet available for storage at Cheesman or 6,072 acre feet in excess of Mr. Field's estimate. In the month of June Mr. Field estimated 25,968 acre feet available for storage. On the same analysis there was available for storage 43,761 acre feet or 17,793 acre feet more than Mr. Field's estimate. In the month of July Mr. Field's estimate was 17,740 acre feet. There was available at least 3,500 acre feet more than was estimated by Mr. Field. For the month of August, Mr. Field's estimate was 9,694 acre feet, there was actually stored in Antero in that month 5,500 acre feet, which at least should be added to Mr. Field's estimate. In September, Mr. Field estimated 120 acre feet for storage. There was at least 9,186 acre feet available, or 9,066 acre feet in excess of this estimate. In the month of October Mr. Field's estimate was 368 acre feet. The stream flow at Cheesman was 6,324 acre feet, there was actually stored in Lake Cheesman 738 acre feet and in District No. 2 during that month, 23,380 acre feet. So that Cheesman could have stored the entire stream flow, or 5,956 acre feet in excess of his estimate. For the whole year 48,208 acre feet additional storage should be added to Mr. Field's estimate, using his own factors and assumptions in view of the storages made elsewhere.

A similar analysis of the results obtained by Mr. Fellows shows that in the month of April, 1912, there was 1,200 acre feet more available than he allowed. In the month of May, 1,800 acre-feet; June, 18,696 acre-feet; July, 3,500 acre feet; August, 5,500 acre feet; September, 9,186 acre-feet; October, 6,324 acre-feet, or a total of 46,206 acre-feet, to which volume should be added any storage in Antero reservoir from January to March and November to December. Mr. Fellows in arriving at the quantity available for storage, treated the amount in excess of his estimated demands on the canon as constituting the storable quantity. In the month of April there was stored in District No. 2 out of the quantity estimated by him to be

necessary for direct irrigation 6,370 acre feet. In the month of May 7,717 acre feet. In the month of June, 9,290 acre feet. In the month of July, 12,400 acre feet. In the month of August, 5,710 acre feet. September, 8,186 acre feet, and in October, 23,380 acre feet. In the month of October, Mr. Fellows estimated that there could have been no storage at Lake Cheesman because his canal demand, 16,883 acre feet, exceeded the stream flow at Platte Canon, which was only 16,040 acre feet. Yet the storage of 23,380 acre feet occurred in District No. 2.

This would indicate that Mr. Fellows' demands upon the canon for direct irrigation were too high. Exhibit A-89 is a tabulation showing the exact storages that have occurred at Lake Cheesman by months, in the various years since it has been operated, with the amount of water that was passing Platte canon at the time the storage occurred, compared with the demands made upon the stream at the canon during the months of the irrigation season by Messrs. Field and Fellows. For the purpose of this exhibit I converted Mr. Fellows estimate in acre feet to cubic feet per second. The data contained in this exhibit is based upon all of the records available. There are many instances where storage actually occurred at Lake Cheesman when the stream flow was much less than the demand stated by Messrs. Field and Fellows.

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For the month of June, Mr. Field's demand upon the canon is 1,000 second feet. Mr. Fellows' demand, 1,023.93 second feet. In June, 1904, considerable storage occurred at Lake Cheesman when the average flow at Platte Canon was 541 second feet, with a mainimum of 407 and a maximum of 792 second feet.

Defendant's exhibits Nos. 1 to 18, inclusive, offered and admitted. Complainant's Exhibit A-88 offered and admitted.

Exhibit A-89 offered and admitted.

Mr. Bull in arriving at his estimate of the demand for water on the canon before storage would be permitted in Lake Cheesman, used a different method than was used by Messrs. Field and Fellows. He examined the records for as many years as data was available, and took as his basis either the demand for water expressed by the water commissioner of District No. 2, or such evidence of demand as was indicated by the reports of diversions of the ditches prior in point of time to Lake Cheesman. I do not think that the reports of the water commissioners are entirely dependable, nor is the fact that a ditch was not demanding, or taking water, evidence that it was unable to get it. It frequently occurs that ditches which can get water do not divert at all or do not divert up to the limit of their decree. And the fact that they are not diverting does not indicate that there exists an unsupplied demand to the extent of the lack of diversion on their part.

If from the water commissioner's reports it should appear that a junior ditch in District 8 was drawing water and a senior ditch in District 2 was not drawing, the natural conclusion would be that the senior ditch in District 2 did not require water. In the regulation of reservoirs in Colorado, the right to store water is ordinarily governed by the conditions existing when the water is at the reservoir,

and not by conditions that may exist when the water has passed the reservoir and might reach the ditches further down stream.

The regulation of the stream ahead of all conditions that may present themselves is hardly a feasible proposition. There
1066 are irrigation ditches all along the South Platte River to the Nebraska state line, distant from Platte Canon from 200 to 250 miles, and from Lake Cheesman from 250 to 300 miles. It would take several days for the water to flow that distance. In estimating the storage at Lake Cheesman I have not permitted storage at any given time unless there was enough water flowing at Platte Canon to satisfy the requirements of Districts 2 and 8. The condition that might affect the regulation of storage at a reservoir where matters other than the presence of the water at the reservoir would be considered is such as would arise with a rising river following a long continued low flow in the stream. Some time might elapse from the appearance of the increased flow at the reservoir until water in sufficient volume would reach the ditches downstream. Such occasions do not occur frequently, but they have been given due consideration and weight in making my estimate of storage. The method of measurement which has always been in vogue at Lake Cheesman is such that the stream flows are recorded, less such loss from evaporation as is sustained in the Lake. The stream flows so recorded, less the evaporation loss, are the flows which have been used by the various witnesses testifying in this case. In order to ascertain the actual stream flow since Lake Cheesman has been in existence, the evaporation loss should be added to the recorded flows. I have made no such additions in making up my estimates of possible storage at the lake. Notwithstanding that fact, I have made deductions for evaporation according to the water surface exposed on the lake, under my assumptions, from month to month. That deduction affords an additional factor of safety in my estimates.

Exhibit A-90 is a tabulation showing records of evaporation experiments at Pikes Peak, Colorado Springs, Denver, Cheyenne and Marston Lake with the factors used by Mr. Bull and the factors used by myself. These were the bases of the deductions for evaporation at Lake Cheesman. The evaporation at Marston Lake would be much greater than at Lake Cheesman. In estimating storage at Lake Cheesman I did not consider the demand of the Platte Canon ditch as affecting that storage in the winter months. I allowed as storage for Lake Cheesman all the water available in the south fork and later in considering the Platte canon ditch rights, deducted from the yield of the ditch whatever deficiencies existed in the stream after the Lake Cheesman storage was taken out. Mr. Field and Mr. Fellows, in estimating storage at Lake Cheesman, gave the Platte Canon ditch a full supply before allowing storage. Their method of treatment decreases the quantity of storage available for Lake Cheesman, by comparison with the method used by me. Using the
1067 stream flows recorded for the South Platte river, which are less the evaporation loss at Lake Cheesman, also decreases the total storage available to the extent that loss occurred from evaporation. Exhibit A-91 is a tabulation showing the quantities which

should be added to the various estimates of storage on account of additions that should be made to the stream flow at Lake Cheesman because of the evaporation loss which has occurred from the Lake; also the additions that should be made to the estimates of Messrs. Field and Fellows, because of their method of treatment of the Platte Canon ditch. In the matter of the additions to be made because of the method of treatment of the Platte Canon ditch, I have gone through the estimates of Messrs. Field and Fellows, year by year and month by month, and made the additions. In the case of the estimate of storage made by Mr. Bull, I have made the additions for evaporation loss only because he treated the Platte Canon ditch in the same manner that I did.

Objection to admission of Exhibit A-91 because it practically involved a change of point of diversion of the Platte Canon ditch. Overruled. Offered and admitted.

In computing the addition to be made to the stream flow for the loss of evaporation in the case of Messrs. Field, Fellows and Bull, I took the area of water surface exposed in the reservoir in each month and applied the evaporation factor used by the individual to whose estimate the increase was being made. In the case of Mr. Field, I used the stream flow at Lake Cheesman as testified to by Mr. Comstock. Mr. Field having stated that he used Mr. Comstock's figures of stream flow in arriving at his estimate of storage.

Exhibit A-92 is a comparative tabulation showing the estimates of available storage by the various witnesses, with corrections for additions on account of the Platte Canon ditch treatment and on account of actual evaporation at Lake Cheesman.

This table is built up from exhibits A88 and A91. Exhibit A92 offered and admitted. I know of no irrigation ditches on the South Platte river having their intake between the point of intake of the Platte Canon ditch and Lake Cheesman. The High Line ditch intervened between the original location of the Platte Canon ditch and Lake Cheesman. Exhibit A93 shows the actual storage that has been made in Lake Cheesman since it has been in operation, with comparisons in the months and years with the estimates of Messrs. Field, Fellows, and Bull, when their estimates of available storage were less than the storage which actually occurred. Offered and admitted.

1068 In the years where they allowed storage to the full capacity of the reservoir, though discrepancies occurred between actual and estimated storage in certain months, I have eliminated the discrepancies. Exhibit A94 is a tabulation showing the actual storage which occurred in Antero reservoir in the years 1910 to 1913 inclusive. And which were not considered or credited as available to Lake Cheesman, by Messrs. Field, Fellows, and Bull. This water did not appear in the stream flow at Lake Cheesman and should have been added to the stream flow and to the available storage. I also ignored this storage in my estimates of storage available for Lake Cheesman. These amounts should be added to all estimates of available storage in Lake Cheesman, because the rights of Antero reservoir being subsequent to Lake Cheesman, these amounts if

available for storage at all would have been available for Lake Cheesman first. I note a deduction for the Antero storage for the year 1912, because in that year all the estimates allow Lake Cheesman its full capacity. I did not consider the storage in Antero in 1909 for the same reason. The figures as to actual storage in Antero reservoir were obtained from the testimony of Mr. Wall. Exhibit A94 offered and admitted.

Exhibit A95 is a tabulation setting forth the various months in which the estimate of storage in Lake Cheesman by Messrs. Field, and Fellows, exceeded my estimate. (By Mr. Dorsey, "Mr. Field went into an extended criticism of Mr. Anderson's figures and deducted in certain months the quantities which in Mr. Anderson's estimate were higher than his own, but he failed to make any additions to Mr. Anderson's figures when they were less than his own.") Exhibit A95 offered and admitted.

Exhibit A96 is a tabulation showing the amounts of the estimates by various witnesses for the purpose of comparison, after the various additions about which I have testified have been made to their original estimates. It is really a summary of the exhibits that have gone before. Offered and admitted.

Exhibit A97 shows the extent to which the 1947 acre feet, Bear creek or Platte canon flow to Marston Lake, which I eliminated from Marston Lake in the months of April and May each year because that reservoir was full, could be utilized by being stored in Lake Cheesman. Exhibit A97 offered and admitted.

Objection, overruled, exception.

Q. Mr. Anderson, various witnesses, as you have already stated, have presented their estimates as to possible and actual storages at Lake Cheesman, and also their statements as to the operating results in operating the reservoir on various assumed drafts for irri-
1069 gation purposes under their respective estimates. According to the estimates of Mr. Field as to possible and actual storages at Lake Cheesman, and upon an assumed draft of 40,000 acre-feet per annum, the efficiency resulting, as appears from Mr. Field's Exhibits 45 and 46, is as follows: An average efficiency for the years 1902 to 1913, a period of twelve years, of 98.4 per cent; the efficiencies in the respective years being as follows: In eleven years out of the twelve, 100 per cent, and in one year, to-wit, the year 1904, 81 per cent; also upon Mr. Field's estimates of possible and actual storages in Lake Cheesman, and upon his assumption thereunder of a 50,000 acre-foot draft annually, an average efficiency results of 92.08 per cent for the period of years 1901 to 1913, to-wit, thirteen years, the efficiency in the respective years of the period being as follows: In ten years out of the thirteen, 100 per cent, and in the other three years the following efficiencies: 1903, 61.5 per cent; 1904, 45.9 per cent; 1911, 89.71 per cent; I ask you to state whether or not in your judgment there is a sufficient difference in the efficiency of the reservoir, as between a draft of 40,000 acre-feet and a draft of 50,000 acre-feet, according to the results found by Mr. Field.

to make any difference in the market price or value, per acre-foot, of a water right in the reservoir?

A. There is not, in my judgment.

Q. On the 40,000 acre-foot draft annually, as assumed by Mr. Field, it appears from his testimony and his exhibits that the following would be the operating results in respect to water left in the reservoir at the end of each calendar year, and in respect to the waste over the spillway: That at the end of the year 1902 there would be left in the reservoir 91 per cent of the assumed draft of 40,000 acre-feet; 1903, 33 per cent; 1904, 10.9 per cent; 1905, 100.4 per cent; 1906, 168.6 per cent; 1907, 191.1 per cent; 1908, 102.3 per cent; 1909, 190.95 per cent; 1910, 121.24 per cent; 1911, 38.66 per cent; 1912, 124.16 per cent; 1913, 135.31 per cent; and at the same time there would have been wasted over the spillway necessarily out of the water otherwise available to the reservoir under its appropriation the following quantities: 1902, 29.7 per cent of the assumed draft of 40,000 acre feet; 1907, 62.39 per cent, equivalent to 24,957 acre-feet in that year; 1908, 9.44 per cent, equivalent to 3,775 acre-feet; 1909, 93.76 per cent, equivalent to 37,505 acre-feet; 1910, 77.96 per cent, equivalent to 31,183 acre-feet. I will ask you to state, Mr. Anderson, whether in your judgment, under those conditions, the operation of that reservoir for irrigation purposes upon an annual draft of 40,000 acre-feet only would be a proper or businesslike or economical method of operating the reservoir.

A. It would be neither an economical nor a businesslike method of operating the reservoir.

1070 Q. Would it be in record with proper irrigation practice?

A. I don't quite get the connection of the word "proper" in connection with irrigation practice in this case. I do believe—and I think that most irrigation operators would not so operate it, on account of the fact that they would not be making the most of the opportunities of the water supply available for the reservoir under such conditions as set forth there.

Q. Do you think any irrigation operator who was in the business for profit would operate it in that way?

A. Certainly not.

Q. Is it your judgment——

A. (Interrupting and continuing.) I mean, further than that, any mutual company or community company operating in the irrigation business would not operate a reservoir under such conditions as that, because it would not be economical nor businesslike, and could be made to render service satisfactorily, on a much larger draft.

Q. When you say "render service satisfactorily," satisfactorily to whom do you mean?

A. To the consumer.

Q. Mr. Fellows also presented certain estimates, and upon his estimates of possible and actual storages at Lake Cheesman, upon an assumed annual draft of 40,000 acre-feet, as assumed by him, and for a period of fourteen years, or, rather, fourteen irrigation seasons,

beginning with 1900, the reservoir, according to that method of operation, and upon his estimate, showed the following efficiencies: An average for the fourteen-year period, on a 40,000 acre-foot draft, of 95.6 per cent, and the efficiency in the respective years of the fourteen year period being: in twelve out of the fourteen years, 100 per cent, in one year, corresponding to 1903, 77.32 per cent; and in the next year, corresponding to 1904, 61.88 per cent. Mr. Fellows made an estimate or a determination of the operation of the reservoir according to his estimate on a 50,000 acre-foot draft for the same fourteen-year period, and for that fourteen year period he got an average annual efficiency, or an average efficiency of 90.95 per cent, made up of efficiencies in the individual years as follows: In ten years out of the fourteen, 100 per cent of the 50,000 acre-foot draft, and in the other years the following percentages of efficiency; In one year, corresponding to 1903, 27.8 per cent; in the next year, corresponding to 1904, 50.6 per cent; in the year corresponding to 1909, 98.2 per cent; and in the year corresponding to 1912, 96.7 per cent, making an average efficiency for that period of fourteen years, on a 50,000 acre-foot draft, of 90.95 per cent, or, as he stated it in his exhibit, in round figures, 91 per cent. I will ask you to state whether or not, in your judgment, there is sufficient difference in the efficiency of the reservoir, according to Mr. Fellows' estimates on the 40,000 acre-foot draft and the 50,000 acre-foot draft,
1071 to make any difference in the market price or value, per acre-foot, of the water rights in the reservoir?

A. No sir, there isn't any such difference, in my judgment.

Q. Under Mr. Fellows' estimates, on the basis of a 40,000 acre-foot annual draft, he had left in his reservoir at the end of each irrigation season of the fourteen—that is to say, at the end of the month of October and on the first day of the month of November—the following percentages of his assumed draft of 40,000 acre-feet, to-wit: In the first year, 133.68 per cent; second year, 107.83 per cent; third year, 58.79 per cent; fourth year, corresponding to 1903, no per cent, fifth year, corresponding to 1904, 1.78 per cent; sixth year, 64.90 per cent; seventh year, 89.93 per cent; eighth year, 177 per cent; ninth year, 92.24 per cent; tenth year, 181.67 per cent; eleventh year, 107.83 per cent; twelfth year, 40.25 per cent; thirteenth year, 131 per cent; fourteenth year, 154 per cent; and at the same time, in operating the reservoir in that way, he was obliged to permit to go to waste over the spillway out of water otherwise available to the reservoir under its appropriation the following percentages of the annual draft of 40,000 acre-feet, to-wit: In the first year, 157.5 per cent, equivalent to 6,305 acre-feet; in the second year, 23.4 per cent, equivalent to 9,359 acre-feet, in the eighth year, 25.9 per cent, equivalent to 10,360 acre feet; in the ninth year, 18.4 per cent, equivalent to 7,367 acre-feet; in the eleventh year, 118.8 per cent, equivalent to 47,516 acre-feet; and in the fourteenth year, 4.5 per cent, equivalent to 1,825 acre-feet. I will ask you to state whether or not, in your judgment, under those conditions, the operation of that reservoir at an assumed annual draft of 40,000 acre-feet was a businesslike and economic operation of the reservoir?

A. No sir, it was not, in my judgment.

Q. Why not?

A. Because, as I said before, it would not be making the most, in a business way, of the opportunities for storage afforded, and in such a way as to fully satisfy the consumers under it upon such assumed draft—in other words, to the perfect satisfaction of the consumer, the draft could be enlarged, in a business way.

Q. Mr. Bull in his exhibit 39, according to his estimate of actual and possible storages, and upon an assumed annual draft of 40,000 acre feet, showed an annual efficiency of 100 per cent for the period of thirteen years, being the years 1901 to 1913, and an average efficiency for that period of 100 per cent; on an assumed draft of 50,000 acre-feet, Mr. Bull, according to his estimates, gave a result in respect to efficiency as of 93.2 per cent as the average for the full period of thirteen years, made up in the individual years as
1072 follows: Ten years of 100 per cent efficiency; one year of 57.98 per cent efficiency; one year of 70.38 per cent efficiency, and one year of 82.99 per cent efficiency. I will ask you to state whether or not, in your judgment, there is enough difference in the efficiency upon the assumed annual drafts of forty and fifty thousand acre-feet as determined by Mr. Bull, to make any difference in the market price or value, per acre-foot, of water rights in the reservoir?

A. No sir, there is not.

Q. Mr. Bull also made an estimate on a 60,000 acre-foot draft for the same thirteen years' period, and in the thirteen years on that assumed annual draft he had an efficiency of 100 per cent in eight years, and in the other years efficiencies as follows: 1902, 95.2 per cent; 1903, 19.5 per cent; 1904, 58.6 per cent; 1911 42.9 per cent; 1913, 86.6 per cent; giving an average for the thirteen-year period, in percentage of efficiency, of 84.8 per cent. Does that represent a sufficient variation from the efficiencies as determined by Mr. Bull on the drafts, of forty and fifty thousand acre-feet, respectively, to make a difference in the price per acre-foot?

A. No sir, not in my judgment.

Q. Upon your own estimates of available storages and actual storages in Lake Cheesman and upon the assumed annual draft of 60,000 acre feet as taken by you, Mr. Bull shows in his exhibit 39 that for the thirteen-year period, corresponding to the period which he had taken, 1901 to 1913, upon your estimates, and upon an assumed annual draft of 60,000 acre-feet, the reservoir would show an average efficiency of 90 per cent, made up as follows: Out of the thirteen years, ten years of 100 per cent efficiency, the other three years showing efficiencies as follows: In 1903, 27 per cent; in 1904, 59.2 per cent; in 1911, 84.2 per cent. I will ask you to state whether or not, in your judgment, there is a sufficient difference in efficiency between the efficiency of the reservoir on the 60,000 acre-foot draft, according to your estimates, and the efficiency of the reservoir according to Mr. Bull's estimates, on the forty- fifty, and sixty thousand acre-foot drafts to make the unit price, per acre-foot, of a water right under any of Mr. Bull's estimates any less than under your estimate?

A. No, there is not, in my judgment.

Q. Do you think there is a sufficient difference in the efficiencies under any of those estimates to make any difference between them——

A. No sir.

Q. —in respect to the market value, per acre-foot, of water rights in the reservoir?

A. No sir, not in my judgment.

Mr. Dorsey: That is all.

1073 Cross-examination by Mr. Nye:

The data in Exhibit A-88 relating to actual storage in Lake Cheesman was prepared from the records of the D. U. W. Co. I compared it with Mr. Field's Exhibit 47 and noted the variations that occurred. The records in the water company's office give the lake elevation from which I computed the acre feet stored. Differences between Exhibit A-88 and No. 47 may be due to errors in computation or slight differences in the stream flow as converted into lake elevations.

In the month of October, 1902, Lake Cheesman actually stored 740 acre-feet, leaving a flow of 62 second feet in the stream after storage was made. In October, 1900, I estimated storage to the amount of 5,208 acre feet, after which there was 86 second feet left in the stream. Comparing this stream flow with the flow in 1902, when storage was permitted, I think my 1900 estimate is justified. The rainfall in September, 1902, was three and one-half times normal, that had some bearing on that storage. The heavy rain was followed by a snowstorm in October, according to the weather bureau records.

The note in June, 1901, "Water within one foot of masonry on the 16th," indicates that a storage was limited that month to the amount of 3,037 acre-feet, because of structural conditions. This exhibit is intended to show only the storage that occurred in irrigation months. The fact that it does not set forth storage in the non-irrigating season does not indicate that there was no storage. I do not know why less water was actually stored in October, 1904, than is estimated to have been available. No storage occurred in October, 1905, because the reservoir was full. Was also full June and July, 1906. About 500 acre feet, less than the estimated amount available, was stored in April, 1912. That available water was taken for other purposes by the company itself. A slight difference in May that year is probably due to differences in converting stream flow into acre-feet and lake elevations. The reservoir was filled early in June, which accounts for that difference. The water stored in District No. 2 in 1912 may have come either from Platte Canon or from tributary streams. In the summary of storage estimates by different witnesses, Mr. Fellows' average for twelve years is 51,148 acre feet; for 13 years, 50,941; for 14 years, 56,316 acre feet. Mr. Bull and Mr. Fellows both estimated the 12-year period, 1902 to 1913, omitting the year 1901, which for the purposes of this summary I added to their estimates, as I also added 1900. Therefore, the three sets of averages. These calculations were made by me personally. I think the addition

of the two full years, 1900 and 1914, to the estimates for the
1074 other years, is perfectly proper considering that records exist from which such computations can be legitimately and fairly made. This is true even though it made the estimated period begin with a high year and end with a high year. I am beginning to doubt that years of high and low flow come in cycles. The so-called cycle is becoming more and more erratic, the period- between low years seem to be increasing, and the fluctuations increasing; that may, however, be only a condition of time. I don't believe that I have avoided the effect of the years of low flow in this cycle by considering the high years at the beginning and end, particularly as that period includes the year of lowest known flow on the stream. 1890 and 1896 were years of low flow, as I recollect them, but not extremely low. I do not recollect that 1897 was a year of low flow. I should have gone back of 1900 and searched all of the years for an average of the flow if there were records upon which it could be done. Those in existence are very broken.

Exhibit A-89 contains figures of actual storage and actual flow. No theoretical or estimated figures at all. The exhibit was prepared to compare with the theoretical storage and theoretical demand estimated by Messrs. Field and Fellows. It shows the actual storage and the actual stream flow at Platte Canon, when storage was allowed, compared with the theoretical quantity required at the canon by Messrs. Field and Fellows. The purpose of the exhibit is to show the actual storage that took place when the amount of water passing through Platte Canon was less than the estimate of requirements by Messrs. Field and Fellows. And to that extent show that their estimate of demand is in error.

The record of stream flow passing Platte Canon given in Exhibit A-89 was obtained from the State engineer's office. The presumption is that before such storage was made in the various periods of the various years the demands of the ditches below had been satisfied. In the month of May, 1903, for example, storage was accomplished when the average flow was 212 second feet. Mr. Fellows' demand for that month was 421 second feet before storage would be allowed. In May, 1912, the minimum flow was 165 feet, Mr. Fellows' demand was 421 feet, there were sixteen days in the month when the flow was less than his demand. In June, 1912, the average for the entire month was 980 feet, Mr. Fellows' demand was 1,023.93. The month of July, 1912, was not considered because the reservoir was filled June 16.

Mr. Fellows alloged storage to the full capacity of the reservoir in
1912, so the conditions stated do not affect the storage to the extent of cutting the reservoir down. The tabulation was not pre-
1075 pared for that purpose, but simply to show that the arbitrary demands estimated by Mr. Fellows are not made upon the canon in actual practice. To this extent it is important, because the first thing necessary in dealing with this question is to ascertain the total quantity of water available for storage. The limitations of the capacity of the reservoir are another matter. I stated that the water

commissioner's reports are an unsatisfactory basis for determining the demands upon the river. They are used to a very considerable extent as the basis for regulating the river flows.

I think that the fact that ditches having direct flow rights do not divert all the water to which they are entitled is indicative that like situations will prevail in the future. There will be periods when they do not divert, and that enters very largely into any consideration of estimated storage.

I am not so sure that the water commissioners' records of diversion and demand of ditches are as accurate as theoretical estimates made, not upon the records, but upon some other basis of calculation. I have never managed an irrigation reservoir, but have been connected with them as an engineer. Among them are two stream bed reservoirs, the Clear creek, and Beaver, smaller than Lake Cheesman, but similarly situated with relation to the stream. In speaking of the proper method of controlling and regulating storage in a reservoir, I do not speak from experience obtained with these reservoirs, but from general knowledge. The operation of Lake Cheesman as an irrigation reservoir would be under the regulations of the State engineer and his subordinates. I do not believe that storage has been permitted in reservoirs when the stream flow was inadequate to meet the needs of the prior direct-flow rights.

In ascertaining the quantity of water which in my judgment was available for storage in Lake Cheesman, I took into account the quantity flowing in the stream and the quantity that should pass Platte Canon as evidenced from time to time, in the various months, by the quantity in the stream, when storage had been permitted at Lake Cheesman. I considered each year by itself to determine the effect of rainfall and climatic conditions upon the general demand for water. From those examples, I formed my judgment as to storage available. The proper demand on the canon is determined by the amount of water which passes Platte Canon before storage has been permitted. That demand has been and will be a variable quantity to satisfy the requirements of practically the same ditches.

It is proper and necessary in order to determine the total quantity of water storable at Lake Cheesman to add the loss due to evaporation from the reservoir to the quantities measured in the stream at that point. In arriving at the quantity storable, we must treat
1076 the stream as though Lake Cheesman did not exist. If there was no obstruction in the stream, such evaporation would not have taken place. After the quantities available for storage are determined, evaporation loss is a proper charge against those quantities assumed to be stored in the reservoir.

In Exhibit A-91 for the months of November and December, 1902, under Mr. Field's estimate, where he estimated no storage, I have nevertheless charged up the amount of the evaporation as determined by me. That evaporation was based upon the existing lake levels. In treating part of the supply of the Platte Canon ditch as storage in Lake Cheesman I proceeded as though the change of point of diversion of that ditch was settled and such a diversion already possible to Lake Cheesman. The legal question does not enter into that assump-

tion at all. To make the assumptions of Mr. Comstock and myself comparable with the assumptions of Messrs. Field, Fellows and Bull, as treated by me, the evaporation loss that has occurred at Lake Cheesman should be added to our estimates of storage available at Lake Cheesman even though, in our assumption, we left that out as an additional margin of safety in our estimates.

The fact that it is treated as a margin of safety in our estimates, does not imply that it should be so treated in the estimates of Messrs. Field, Fellows and Bull, because of the difference in the method of treating the demand upon the canon. Their method applies the maximum demand against the stream, that can be made. In my method of treating part of the water of the Platte Canon ditch appropriations as storable at Lake Cheesman, I did not consider that the appropriation of the Platte Canon ditch was not all required for domestic purposes in the City of Denver. I did not consider the demand for domestic purposes at all, but simply considered the product of the Platte Canon Ditch in water, for the purpose of valuation. It was simply a consideration of the quantity of water that this property can produce, divorced from its present condition, and with the question of domestic needs, entirely eliminated.

I insist that the quantities shown on Exhibit A-93 as having been actually stored in Lake Cheesman in certain years, and months, in excess of the theoretical storage allowed by Messrs. Field, Fellows and Bull, should be added to their estimates of storage. The storage was made and apparently legally. I do not understand that Mr. Bull added the storage that had been made in Antero Reservoir to his estimate of the storage available for Lake Cheesman. The total storage in Antero reservoir from 1910 to 1913, inclusive, was 53,500 acre-feet, from which I deducted 29,000 acre-feet for 1912, leaving
1077 24,500 acre-feet for the years 1910, 1911, and 1913, which spread over the period of 15 years increases the average annual storage in Lake Cheesman 1,633 acre-feet, or spread over the 14 year period increases the average, 1,750 acre-feet. This is simply applying it to the annual average storage and has nothing to do with the assumed total storage accomplishment in any individual year.

If I am wrong in my assumption that Mr. Bull did not add to the storage available for Lake Cheesman the storage made in Antero Reservoir, then the quantities that I have added to his estimate on that assumption should be deducted. Exhibit A-97 is prepared simply to show what portions of the Bear creek and Platte canon supplies that were available, but could not be stored in Marston Lake, might have been stored in Lake Cheesman in different years under consideration. With these rights in common ownership exchange could be made to make possible the utilization by storage in Lake Cheesman.

In the practical operation of any irrigation system, storage or direct flow, efficiency has a great deal to do with both the actual and market value of the water rights. It is difficult to determine the point at which falling efficiency affects market prices. I gave my answer to the hypothetical question on the experience which I have had in a successful reservoir in which the water right prices

are maintained and in which the efficiency is not so high as that under consideration here. I don't think anybody can undertake to say where that efficiency would affect value, whether from 75% to 50% or anywhere near that, but from the experience in Northern Colorado where reservoirs have been developed, we do not know that an efficiency of 80% and upwards makes no difference in the market value. It is true that Lake Cheesman has never been operated as an irrigation reservoir, and that the testimony here is based upon the estimates of the various witnesses.

Redirect examination by Mr. Dorsey:

In Exhibit A-88 notes referring to precipitation relate to the precipitation at Denver. In reviewing the years from 1899 to 1914, as a basis for my estimate of storage at Lake Cheesman, I have taken into consideration every year for which sufficient data is available upon which to base judgment. Prior to 1899 there are practically no records of Cheesman, and Platte Canon records are broken and interrupted. It makes no difference whether Lake Cheesman has been operated as an irrigation reservoir or not. For the purpose of my estimate of storage, it was considered as an original proposition, having no connection with what it might or might not have been in the past. I have kept myself in-
1078 formed for the past 30 years as to the operation of reservoirs for irrigation purposes.

Messrs. Field, Fellows and Bull arrived at their estimates of storage available in Lake Cheesman by applying an arbitrary and unchanging rule of demand to the stream flow at Platte Canon. It was my purpose in making the additions for evaporation losses and method of treatment of the Platte Canon ditch supply as shown by Exhibit A-91 to the estimates of Messrs. Field, Fellows and Bull, to indicate that even with their unchanging and arbitrary demands upon the canon there was sufficient available storage actually in the stream to give the result as shown on my final assumption. In adding the storage accomplished at Antero reservoir to the storage available at Lake Cheesman, I did not add any given quantity for any individual year, but simply increased the average for the period to the extent set forth in Exhibits A-94 and A-96. The storage shown by Exhibit A-96 is the net available limited by the capacity of Lake Cheesman. If the gross storage available was being considered, then the storage accomplished by Antero reservoir in the whole period from 1909 to 1913 should be added to the total available for Lake Cheesman.

The elements that determine the efficiency of water rights are different in the case of direct flow rights than in storage rights. In the case of the direct flow right the quantity of water in relation to the appropriation, and the time at which it can be obtained in relation to the demands of the crops, are the important elements to be considered in determining its efficiency. In the case of stored water, the element of time with reference to the critical period in the crop growing season can be always controlled.

Recross-examination by Mr. Nye:

There is some uncertainty even in the matter of delivery of reservoir water. There is such a thing as a 100% efficiency in a direct flow right but very rarely. It makes no difference to the individual irrigator whether he gets his water from direct flow rights or from reservoir rights, if he gets the water at the time he needs it.

Witness JAMES C. SWEENEY.

Direct examination by Mr. Hodges:

Am superintendent of the city division of the D. U. W. Co. Have been employed by the company, or its predecessors a little over 24 years, serving in the capacities of calker, forman and super-
1079 intendent. Have served in the present position a little over 7 years. My department has to do with the opening of streets, building of extensions to pipe system, repair work and matters of that kind and the employment of labor for such work. The present scale of wages for unskilled labor is $2 a day for 9 hours, and for skilled labor, $2.25 and $2.50 a day for 9 hours. Objection overruled. Exception.

These rates of wages have been in effect for a little over five years. The $2.25 rate applies to men who investigate leaks and do certain classes of pipe work. The $2.50 rate applies to calkers, and men who make the joints on cast iron pipe. The largest number of skilled laborers employed are of that class. By comparison with them we have only a few $2.25 men. Prior to the time that this scale of wages went into effect, the rate of wages was lower. In 1893 and 1894, and up until about 1897 we paid $1.50 per day for unskilled labor for 10 hours and from 25 to 50 cents a day more for skilled labor. From then until about 5 years ago we pair $1.75 a day for unskilled labor for a 10-hour day and a proportionate raise for skilled labor. Scale now in effect is the prevailing scale with the other public utility corporations.

When openings are made in paved streets for the purpose of doing work on mains, the pavements are replaced by the city after the pipe work is completed, the company being required, before the opening is made, to deposit with the city a sum sufficient to cover the cost of replacing the pavement and probably 50% more. When the repairs are made the city deducts from the deposit the cost and refunds what is left, if any. The prices charged by the city for asphalt and concrete pavement is $3.00 per square yard. Stone, $2.50 per square yard. Macadam, $2.00 per square yard, and in surfaced streets, 15 cents per lineal foot with a flat charge for small openings of $2.50. The city requires us to backfill the hole properly by tamping or flushing, then cover it with plank brought level with the surface of the paved street, later the city removes the planking, installs a concrete base under the pavement and — the pavement.

Objection to interrogation as to area of pavement cut away and replaced with reference to size of excavation, overruled, exception. The excavations are usually allowed to stand some time to permit

settlement before the pavement is repaired. Sometimes they stand for months, then the portion of the pavement outside the excavation that has been beaten down by vehicles is cut away and usually the area of pavement replaced is much larger than the area of the excavation. The new pavement always overlaps the old base
1080 to give it firmer support, the lap being from 4 to 6 inches on each side of the hole. We use water to settle the trench when it is convenient, except in clay ground where we tamp the backfill because water would keep the clay soft too long. The plank that we place over the excavation is removed by the city. I don't know what becomes of it. We use plank three inches in thickness and 10 and 12 inches wide as required.

Cross-examination by Mr. Stevens:

What I have testified about is the custom of the city in relation to repairs on paved streets. I never undertook to construct a wholly new system and don't know what the custom of the city might be in relation to that.

Redirect examination by Mr. Hodges:

I have constructed extensions of the water system under surfaced streets, but I do not recall any under asphalt streets. There has been no difference in the treatment of the question by the city in extension work or in repair work.

Recross-examination by Mr. Stevens:

Proportionately more cutting in pavement would be necessary on the repair openings than on long trenches, because of the overlap at the end.

Witness WILLIAM O'GARA.

Direct examination by Mr. Hodges:

Reside in Denver. Am a general contractor, in which business I have been engaged 16 years, and for 15 years prior to engaging in contracting was in construction work for others. Work consisting of water work, railroad, harbor improvements, canal, building, and iron construction. My first work was with the Chicago, Milwaukee and St. Paul railroad, between Ottumwa, Ia., and Kansas City. Later on the Duluth, South Shore and Atlantic railroad, between Soo Junction and Sault Ste. Marie, later in charge of installation of four tracks on Pennsylvania railroad entering Philadelphia, that required raising the tracks and depressing the streets, taking care of paved streets, gas mains, water mains, and sewers, and erecting steel bridges. Later in installing a four track road on the Pennsylvania railroad under the Delaware and Raritan Canal in Trenton, New Jersey, later in charge of the construction of the Mexico, Cuernavaca and Pacific Railroad in Mexico, later
1081 in charge of the harbor work at Tampico, extending the jetties, involving an expenditure of about a million and a

half dollars, later was in charge of the construction of the Chihuahua-Pacific railroad, involving an expenditure of 6 million dollars, 4 million dollars of which came under my jurisdiction. Carried out part of the work as superintendent and part of it under contract; that is where I started in the contracting business. Since then built the Colorado & Southern Interurban lines between Denver and Louisville Junction. Built the double track in Eagle Canon for the Denver and Rio Grande Railroad. Part of the water supply system for Colorado Springs. Built approximately 30 miles of conduit for the D. U. W. Co. and several irrigation canals throughout the state. The conduits that I built were Nos. 5, 6, and 7 and am now engaged in building a new conduit from Marston Lake to the city, known as No. 9. Have had experience in hauling material and delivery to the place of installation. Have made an investigation of the use of motor trucks for use for that purpose in connection with the work now under way. Objection to result of investigation, overruled, exception. I asked a motor transportation company to submit a price for delivering material necessary for the construction of this conduit. Representatives of the company, with a man named Langston from Kansas City, manager of the Kelly-Springfield Motor Company, after investigating the work, declined to submit a price. I concluded to continue delivering material as I had heretofore with teams. My experience delivering material by teams based on cost figures, kept by me, shows the cost to range from 30 cents to 50 cents a ton mile. On the conduit I am now constructing I am paying for hauling the material $1.50 a ton for an average haul of 2.35 miles at the rate of 62½ cents per ton mile. If this material could be hauled cheaper by motor trucks I would have employed them.

I am familiar with the road from Buffalo to Lake Cheesman. The road could be so repaired and reconstructed that motor trucks could be used to haul material over it. I am familiar with the location of the several conduits of the D. U. W. Co. and the roads by which they are reached. Motor trucks could be used, but I don't think it would be advisable for a contractor to use them for the transportation of material, it would be better, cheaper and more reliable to haul by team. Am familiar to some extent with the distribution system of the D. U. W. Co., part of the material for which could be hauled by motor truck. Teams would be necessary in the outlying districts. I could not state the percentage of the hauling by motor trucks and teams without a detailed investigation to determine just where the
1082 pipes were going. I have had experience with trenching machines. In 1909, I undertook to use one on the construction of Conduit No. 6, length of which was between 13 and 14 miles, requiring a trench 6 feet wide at the bottom, with a slope of ¼ to 1, varying in depth from 7.2 feet to 20 feet. After taking the contract I entered into negotiations with manufacturers of trenching machines for a machine that would excavate that trench. The agent for the Parsons Trench Excavator represented that their machine would dig a trench 78 inches wide and up to a depth of 20 feet, and guaranteed a minimum capacity of 45 cubic yards per hour. On this

statement I estimated that by operating the machine 20 hours per day I could excavate 500 lineal feet of trench per day. I entered into an agreement to purchase the machine for $9,000 if it would do the work. The machine was delivered for thirty days' trial and started to work in South Denver, I believe at Exposition Avenue; the material was not very hard, just ordinary Colorado work. The machine accomplished about 20% of what it was guaranteed to do. After 30 days I notified the manufacturers that I would not take the machine; they sent their designing engineer and general sales agent to Denver to see whether they could remedy the trouble. The result was that they built a special machine 7,500 pounds heavier than the first one, which accomplished approximately 5% more than the first machine; the result was that the actual cost of excavation to the manufacturer without taking into consideration the cost of the machine or repairs, was about 5% more than it would have cost me by employing other methods. With the repair costs amounting to about 10 cents per cubic yard, the cost was 50% more than it would have been with teams. The machines were constantly operated by the manufacturer. The machine excavated about 23% of the trench for that conduit, the balance was done by teams and hand labor. I have seen such trenching machines used elsewhere. I am not using a machine on conduit No. 9, because in my judgment it cannot be usd advantagously and economically on a trench of that size. A machine will work fairly well in soft material that has a tendency to cave, but it is necessary in that material to retard the progress of the machine to the rate of progress you can make in timbering the trench.

A trench caves much more excavated by a machine than by teams. There are places on the distribution system within the city of Denver where a trenching machine would work fairly well on the smaller trenches, in such localities as near Berkeley Lake, Washington Park and northwest of City Park, where there is a sandy soil. But there are many places where the trenching machine could not be
1083 used economically within the city, taking into consideration only soil conditions. In the districts in the city where there are paved streets, street railways, water pipes, sewers, and poles at the side of the street, the progress of the machine would be retarded, increasing the cost of excavation which would be governed by the amount of construction encountered. I should say as a reasonable estimate you would get three or four per cent efficiency out of your machine. The excavation would not be as cheap as by ordinary means. Where poles occur at the side of the street and overhead wires, they would interfere with the conveyor which carries the dirt away from the machine, necessitating taking down the pole or removing the conveyor for each such obstruction.

Were I figuring on reproducing this pipe system, I would expect to use trenching machines on the smaller trenches where it could be handled to advantage, and do the rest of the excavation by hand labor and with teams, and would figure on excavating for the conduits entirely with teams and hand labor. Objection overruled. Exception.

Plates 27 to 30, following page 107, Exhibit C, show the cross sections of conduit trenches as constructed by me for the D. U. W. Co. The trenches are excavated according to those plans with side slopes in order to give the skilled laborers room in which to construct the pipe. On Conduit No. 6 we built about 600 feet of pipe in a trench 78 inches wide with vertical sides, with the result that the pipe would not hold water when it was turned in, because the workmen did not have room in which to build the pipe properly. They could not reach portions of the pipe with a hammer to set up the bands as they cinched them. Proper setting and cinching of the bands is essential in the construction of wood stave pipe, and the trench must be constructed in the manner indicated in order that that operation may be successfully carried on. Trench machines do not construct a trench in that shape. Such a pipe could not be built in a straight side trench having a width 28 inches in excess of the internal diameter of the pipe, as stated by Mr. Bickel. As a contractor I would not take a contract to build a pipe in that kind of a trench, because I would have to guarantee the work after the pipe was in service and supply a bond to protect the guarantee and in a trench of that size and width I could not comply with the contract.

In backfilling the conduit trench it is necessary to backfill by hand and tamp the material to a height of six inches above the center of the pipe. That portion of the trench must be filled with selected material free from rock and lumps. The tamping must be
1084 done carefully to properly support the pipe. That portion of the backfilling represents about 25% of the work. The balance is put in by teams with scrapers. If the work is done in public road that is surfaced, we remove the surfacing first, in making the trench and replace it, bringing the road back to grade after the work is completed.

If the material around the lower side of the pipe is not properly tamped and put in the movement of the pipe when water is turned in may result in leaks and breaks. The selection of the material for the first part of the backfill is frequently expensive. In rock excavation it is necessary at times to haul this material a considerable distance. I have figured the actual cost of the backfilling. The cost of the tamped portion is 24 cents per cubic yard and of the remainder of the fill 13 cents per cubic yard, the 24-cent price applying to 25% of the total fill and the 13 cents to 75%. I have found the average cost of excavation for 48-inch pipe to be 26 cents per cubic yard for earth, 50 cents for loose rock, $1.25 for solid rock. In one case on conduit No. 6 it cost me $12 per yard for wet excavation, and in another case $6 per yard; the yardage was small, about 350 yards at the crossing of the Platte river near Petersburg. The cost of that excavation was $12 per cubic yard. The prices that I have given apply to work within a radius 14 or 15 miles of Denver, where the rock is soft. When you get into the granite the cost of rock excavation is higher. On conduit No. 8 in Platte Canon I bid $1.75 per cubic yard for rock excavation in 1911. The unit costs that I have given for excavation and backfill are the average price per yard on all of the work that I have done on about 30 miles of conduit.

I have made no investigation of the conditions applying to the other conduits of the company, and would not say without investigating that those prices would apply to them. You will find many different costs on different lines. On Conduit No. 6 within a distance of 1,500 feet the cost varies from 20 cents to $1.50 per cubic yard. The total cost to me of the Platte river crossing on Conduit No. 6 was a little over $6,200.

I have investigated construction work at Raton, New Mexico. In my judgment material would be a little easier to handle in excavating there than in Denver. The formation is sandstone erosion and as a rule that is easier to work than the material in the vicinity of Denver. There would be comparatively few obstructions in the streets in Raton. It is a small town without any paved streets or street railways. In designing a water works system there the engineers no doubt have avoided encountering these obstructions or reduced them to the minimum. In Denver it would be quite a problem to avoid obstructions.

1085 In my judgment, the distribution pipe system and the conduit system in Denver could not be constructed within two years without enormous unnecessary cost. I would not say how long it would require to do that work without having at least sixty to ninety days for investigation after the plans and specifications were furnished me by the city of Denver, but from my experience I would say that it could not be constructed economically in two years. Such work can be done with great rapidity, but at a greater cost than would be normally encountered. It is my experience in my business that the overhead cost and profit represents from 22% to 25% of the actual cost of the work under way. This is necessary to cover the contractor's office, legal and general expenses, interest on the money that he is required to furnish, contingencies, and his profits. On work of this character a considerable percentage of the contract price is retained until the work is completed and finally accepted.

If the period specified for the completion of the work was shorter than it would ordinarily take, the overhead charges would be increased. It is customary for contractors on work of considerable magnitude to employ their own engineers, to advise and consult with them during the progress of the work and not to rely wholly upon the engineers of the company. There is a difference in this respect between large contracts and small contracts. On the conduit work during the last five years, I have paid $2 a day for common labor and $3 a day for skilled labor for 10 hours. For some labor I pay a still higher price. The average wage on conduit No. 6 was $2.62 per day for 10 hours. Owing to scarcity of work there is more labor available now than there is usually, but I am paying the same price that I have paid heretofore. I presume I could secure labor cheaper than in 1909 but pipe work requires men with some experience, and I do not believe it would be advisable to employ the cheapest labor possible. I would not get satisfactory results. In 1907, labor costs were higher than they are now.

The price of labor is determined by momentary labor conditions.

I have had no experience in the relaying of asphalt pavements. I did some work in connection with relaying stone pavements in Philadelphia. In my experience on construction work in the city a contractor will not be permitted to obstruct any considerable amount of street with construction material or open trenches. In the work on Conduit No. 6 on University Avenue, the commissioner continually watched us, and while the street was in the outlying districts he would not permit me to have more than 3 blocks involved in the construction at any time. He watched me very closely
1086 and I endeavored to comply with his requirements in that respect. I would not consider it advisable in constructing a work of this magnitude to distribute material very far in advance of construction. As a matter of self protection the contractor should not do it, because of the liability of accident and the necessity for protecting and red-lighting the pipe at night. I am not familiar with the requirements of the fire department as to distributing obstructions in the streets. In opening trenches at cross street intersections it is required that provision be made to take care of traffic at these intersections. In handling cement, when I was doing work for the Colorado Fuel and Iron Company, using from 10 to 15 carloads a day, we provided a warehouse with a capacity of 40 days' supply in order to allow time between the date of delivery and date of use of the cement for the tests that were necessary to determine whether the material was of proper quality. This is the usual system on large work where they are careful and interested in getting good work. If the cement manufacturer is aware that such tests are not made he is liable to ship cement of very little value. This method requires about four handlings of the cement.

Cross-examination by Mr. Stevens:

I did some work in Philadelphia on water works construction, approximately 25 miles of pipe. Also did some work for the City of Colorado Springs, in 1903 or 1904, contract involving between $250,000 and $350,000. Built two reservoirs, 3 or 4 miles of pipe line and some tunnel to connect up the Colorado Springs system with the Seven Lakes supply.

I think the contract on Conduit No. 6 was awarded as a result of competitive bidding. I furnished a detailed bid. As I remember the total price I received on this contract was between $130,000 and $140,000. I don't know what anyone else bid. It is not true that that contract was awarded to me because of any relationship with anybody connected with the water company or with the First National Bank. It is my understanding that it was awarded as the result of competitive bidding. I know that other contractors went over the work. I think I allowed for excavation the figures I stated on direct examination. In the case of some other work I allowed less than the figure about which I testified.

The job was not a profitable one. I lost $2,800 on it. The conduit started at the Capitol Hill reservoir and ended at Wynetka station, about a mile west of Littleton. We encountered obstructions

in the way of service pipes, sewers, crossings of Cherry Creek and the Platte River, street railroad tracks and railroad tracks.

1087 In crossing the sewers we had some large special steel fittings that cost $25 each to haul from the West Denver station, of the D. U. W. Co., to the place of installation, somewhere on Clayton street. That was not my first experience on wood pipe construction. In 1907, I built conduit No. 5, from Cherry creek near Sullivan to the Capitol Hill reservoir, that was about 6 miles long. In 1910 and 1911, I built conduit No. 7, about 10 miles long. It was on conduit No. 6 that I experimented with the trenching machine. Such machines were not quite new then. They had been using them for a number of years. I had attempted to use one on a previous occasion but the material was too hard.

I should say that about 40 per cent of my work has been railroad work. My work at Colorado Springs was all outside of the city. I know they have had some difficulty with the reservoirs at Colorado Springs because of the moraine formation on which the dams are built. It is necessary to cover that formation with puddled clay in order to make them water tight. That work was done by the city with its own forces and not by me. I have investigated the Austin Trenching Machine to see whether or not I cared to purchase one, but have not actually operated it on work. I have not used a trenching machine since my experience on conduit No. 6. They have been experimenting with them and endeavoring to make improvements on machines but they have not, to my knowledge, succeeded in making substantial improvements so as to construct a reliable machine to excavate a trench such as described for this conduit work.

I know they are almost universally used wherever the soil will permit. That has been true for some years. But machines are not built that can excavate all the soil in Denver and vicinity and do it economically. I know that Charlie Connors has attempted to use trenching machines in Denver from time to time and has brought suit against the manufacturers for damages. He still uses machines where material is favorable. I don't think he would use them if they were not profitable. I do not intend to use machines on conduit No. 9. It is not part of my contract that I should not use them, but absolutely on my own discretion and choice. I understand that I got the contract on conduit No. 9, on a competitive bid. A private corporation does not notify you as to who you are competing with. I submit a proposal in accordance with their request, if I am a successful bidder I get the contract, that is as far as I know.

It might be the custom now to have cement tested at the mill and accept the mill test. It might be handled that way, if you

1088 care to take chances, but as a matter of business I don't think that even though it is the custom to accept the manufacturers' tests, that it should be practiced. It probably would be less expensive to handle it that way than the way I have described.

It is true that I have never engaged in a city enterprise of the extent and character of the reproduction of this water plant. I was in Cincinnati when a similar work was going on and had occasion

to investigate the conditions. There was no considerable amount of pipe distributed along the streets there. In the outlying districts they permitted delivery of material considerably in advance, but in the city they were just allowed what was necessary to carry on construction operations.

I know that during the construction of the Subway in New York they excavated the entire street and fenced it in. I have noticed pipe on the sides of the streets in New York, but did not inquire as to why it was there. As a contractor I would not use the streets for the storage of material but would provide a storage yard and transport it to the works as required. I believe in the end that it would be more economical. If another contractor saw fit to store it in the street, I presume he would arrange to take care of the difficulties that might arise from so storing it. Personally I would not do it. I have never used motor trucks for the delivery of my material.

I was paid unit prices on conduit No. 6. The total price received was between $130,000 and $140,000. I don't remember exactly, I will have to look it up. I lost $2,800 on the job. I did not figure any overhead charges against the job at all. The work cost me $2,800 more than I received for it in cash. I charged to the work only the actual cash expenditures on the work. I did not charge contractor's bond, interest on the money, and contingencies, because there was nothing left to charge them against. I did not know in advance that I was going to lose money on the job.

If you want to get at the paper loss on the job add 22% to the entire cost of the work and you will have it. My books do not show that, because in my way of accounting you cannot charge a loss for something that you never had. I paid for my bond which was a cash expenditure. I drew no compensation for myself out of the work. At the time this work was under way I had about a million dollars' worth under way. This work was entered on the books as part of the general work. I drew money for myself out of the general business. The contractor on the job was The Phillips Construction Co. and O'Gara.

The Phillips Construction Company and myself were associated together on the work and were on all construction work
1089 for about 8 years, up to six months ago. I am now operating for myself and they for themselves. The actual cost to me of conduit No. 6 was approximately $142,000. That covers the actual money expenditures on the job. Nothing was charged to that work at all for our general expenses because there was nothing there to pay it. I don't understand the nature of accounting they refer to where a man attempts to make entries on his books for a profit before it is earned. I have never kept my accounts that way. The actual cash expenditures were all charged to the work but I have expenses in maintaining the business outside of them. The $2,800 was an actual monetary loss after having paid the actual expenses of construction. I never did any work in Raton. I made investigations there for construction. I think there are probably one or two blocks in Raton pretty thickly built up.

Redirect examination by Mr. Hodges:

In figuring what was actually paid out on conduit No. 6 nothing whatever was included for any payment to the Phillips Construction Company or myself or anyone else for the overhead organization of the company employed on the job. That was a matter of cost and should be pro rated against that work the same as other work, but it was not repaid and is not included in the figure of $142,800 that has been spoken of here.

The price paid me did not include the material for the conduit. That was all furnished by the water company. The company also did some special work in connection with the conduit, and in making connections with other mains. Those expenses should be added to what was actually paid me. Liability insurance protects the contractor under certain limitations and he is required not to violate the provisions of the policy or he will not get the protection for which he is insured. That is one of the reasons that I am careful not to place unnecessary obstructions in the street or to string pipe along the streets for miles in advance of the work. The openings that were made in the streets of New York for the construction of the subway were such as were essential for the necessary progress of the work. The cost of maintaining traffic while this work was in progress must have been considerable. That character of expenditure is commensurate at all times with the inconvenience to which the public would otherwise be subjected, and the greater the amount of open work in the city the greater the expense. I could use trenching machines in my business if they were perfected to handle the work economically or for less cost than by my present method. In my judgment the Austin Machine today is not perfect to excavate a
1090 trench 7 feet wide and 20 feet deep. If I had used trenching machines throughout the work on Conduit No. 6 I would have had to use eight machines to complete the work within the time limits. These machines with equipment would have cost me $80,000.

Recross-examination by Mr. Stevens:

If the proportion of the overhead expenses of our company that should have been charged to conduit No. 6 had been so charged they would have amounted to between 10 and 11 per cent on the cost price of that work. I did not charge that because there was nothing to charge it against. The work showed a loss. The overhead charges are going along constantly in the office. That has been detailed by the general office and may run two years before it is applied to the work. Our office expenses and other charges amounted to between 10 and 11 per cent of all the work that was being carried out during the period that that work was being done. In the construction of Conduit No. 9 the water company is furnishing all material the same as it did in the construction of Conduit No. 6. In the work for the water company I have not been obliged to make any provision for storage of materials. That expense is borne by the water company. My contract relates to the transportation of the material, excavating the trench, and actually installing the pipe. I

have not inquired of the water company what it costs them for storage, but I have a general idea of what it costs to store material. There are five different classifications of soil in Denver, much of it classed as earth is so hard that trenching machines could not handle it economically. There is one ideal material, a sandy soil, where a trenching machine will work beautifully and at low cost. I don't know whether a trenching machine will work in adobe soil. If I had a chemical analysis of it I might be able to tell you. If I had a contract for the complete construction of a water system I would use trenching machines where I could excavate with them for less cost than by other methods.

Redirect examination by Mr. Hodges:

I would not use trenching machines in the construction of the conduits if I were to build them. I have determined to my satisfaction that that is impossible. I would use them for excavating small trenches in particular districts where they have a sand loam soil, by small trenches; I mean trenches for from four to 20-inch pipe.

The ten or eleven per cent that I stated represented the office and overhead costs on our work would not include any profit.

1091 Witness DAVID D. SEERIE.

Direct examination by Mr. Hodges:

Have resided in Denver 35 years. Am a builder and stone mason. Am connected with the firm of Geddis and Seerie. We constructed the Cheesman Dam. Have built a great many buildings in Denver and elsewhere. Among those the Trinity Church, Railroad Building, Brown Hotel and the Capitol Building. Built the post office at Omaha, the post office at Kansas City, a dwelling house for General Palmer at Glenn Eyre, with a number of others in Wyoming too numerous to mention; also built the Pathfinder Dam in Wyoming.

The Pathfinder and the Cheesman are the only large dams we built. The Pathfinder contained about 60,000 cubic yards of masonry. The Cheesman about 104,000 cubic yards. We were engaged in the construction of Cheesman Dam about four years. When we started in the necessary location work and exploration had been done. There was a masonry wall in there that was part of the first dam, that was left in the new dam. We did considerable excavation in the bottom of the channel, but the trench for the excavation had been started, the outlet tunnels built and a temporary diverting dam constructed. We proceeded with the construction work as rapidly as it could be done and done properly and economically. The dam could be constructed in less time, but it would cost a good deal more. You would have to run two shifts of men. The old wall that was incorporated was part of the core wall of the old dam with a steel facing, which extended up the sides quite a little ways. We paid drillers 30 cents an hour; common labor, 25 cents; stone masons, 50 cents; teaming, 50 cents; blacksmiths, 55 cents; helpers, 27½ cents. Labor prices are a little higher today.

Mr. Bickel's assumption that he would have to quarry only 72,902

cubic yards of rock to furnish with the mortar the 102,897 cubic yards in the dam is not correct. There is never any allowance for mortar joints. You can take that 104,000 cubic yards of rock and fill it in with about 1-3 of mortar and you will not have any more than 104,000 cubic yards when you get the mortar filled in. There is a space to be filled, that is because you measure the rough outside of the rock at the largest dimension, and there are spaces left that are filled up with the mortar. You have to quarry the whole contents of the dam. There wasn't very much waste from the quary at Cheesman. That was an exceptionally good quarry. In other places where we have been quarrying we waste as high as 25%. That would be a good safe thing to go by unless you were perfectly sure of the place.

1092 I wouldn't say that we made a profit on the job. We probably got a pretty fair salary out of it, each of us, for the time we were on the work. If we had no other work going on at the same time we would have used all we got out of it in living during the time it was being constructed. In taking into consideration the profit, I did not consider overhead, interest costs, bond, liability insurance, etc. We happened to have enough money to keep running, so we didn't take into consideration any interest charges or funds necessary to run the work. I wouldn't want to build the dam today for the same price. It would cost about 10 per cent more. Our construction plant cost about 90 cents a yard, actual money paid out for it, or approximately $90,000. That included boarding houses and all temporary structures that are burned up when you are done with them. Our cost did not include a temporary dam, that was already built. I would consider 15% a fair allowance for contractor's overhead costs and profit. That is, 15% on the total cost.

Cross-examination by Mr. Stevens:

I don't remember just how much we received for the job. The water company's books would show it. Our books have been burned up. I keep them 6 years after the job is finished, and having so many jobs they accumulate too fast. We were paid in cash every month. We got the job on a competitive bid. Afterwards I believe there was a little cut made in it before the contract was entered into. We included, when we were making the contract, 15% for overhead charges, etc., but when we got through we did not include any of them. You know jobs don't always turn out the way you figure at the start. The accounts on this job were kept at Cheesman. We had a whole town there, even a postoffice. The work was carried on separately from our general office. The books were kept there by a bookkeeper who was right on the job all the time. We include these overhead charges in the estimates of our work, but don't carry them in our bookkeeping. We keep separate books on the job on all big jobs.

There were a few hoisting engines saved from the construction plant, that we shipped to Caspar, Wyoming, that amounted to maybe $7,500 dollars. We had invested in the total plant about $90,000. We were not held back in the work waiting for the dam to fill with

water to assist us in floating material. The fact that we didn't have the water added to our expense because we had to use teams. But we couldn't have done the work any quicker if we had had the water. The total price which we received for the work was $477,998.15. I
1093 am able to state this, having refreshed my memory. The water company furnished all the cement and materials, except the rock and sand, that we got right at the dam.

The company put in the pipes and valves in the tunnels and all that. The front part of the dam was all dressed stone laid in about an inch mortar joint. The back of it was just square blocks, as we could get them out of the quarry laid up as close as we could get them. That would all come under dimension stone. The irregular stone was placed in the center of the wall. No allowance whatever should be made for the mortar, for instance, you take a cubic yard of crushed rock, you put in about a third of a yard of sand and put in a barrel of cement and you only have a yard of concrete. There were three of us in the company, Mr. Geddis, Mr. Anderson and myself. Between us we got about $60,000 out of the job. That isn't any profit.

Redirect examination by Mr. Hodges:

I was on the job the greater part of the time, superintending it. We found the sand on the ground just the same as we found the granite. The company owned the land where it was located. We just took it and used it. I believe the company had opened up a little of the quarry for the rock fill dam before we started to work.

Stipulation between parties to permit statement in writing by Allen Hazen, as to accrued depreciation up to time of former appraisal, to go into record as though testified to by Mr. Hazen.

Witness LEONARD METCALF.

Direct examination by Mr. Dorsey:

Exhibit A-98 is a table comparing the estimates of the various witnesses who have testified as to the value of the property of The D. U. W. Co. both on behalf of the city and the company. The original figures set forth in Exhibit C have been corrected to reduce them to a statement of the fair contract price at which the property could be reproduced. This price includes all expenditures necessary to be made by the contractor in the prosecution of the work. It excludes such costs as would be borne by the company preliminary to, and in connection with the work, which were included in the original estimates of value set out in Exhibit C. The prices given for Messrs. Gaffy, Bickel, and the Public Utilities Engineers, are the prices contained in their exhibits, with deductions, where deductions are necessary, and additions, where additions are neces-
1094 sary, as indicated by their testimony given in the case, in order to make their figures comparable on this basis with the figures taken from Exhibit C. Notes in connection with the exhibit explain the treatment of certain items of property which were valued

in Exhibit C, but which were not valued by the witnesses testifying on behalf of the city. For the purpose of study of this table these notes must be considered in connection with the figures set out in the different columns bearing upon the value of different items in the plant. The figures given are for reproduction cost of the plant, new, with no allowance for depreciation. They embrace classes C to S being the structural property of the plant. And exclude Class A Lands, Class B Water rights, and Class T personal property, and materials on hand. The final figures for each of the estimates are as follows: Metcalf & Anderson, $9,416,861; John Gaffy, $8,361,406; Ackert Bickel, $8,662,437; Public Utilities Commission Engineers, $8,755,212. The exhibit readily shows the items upon which the major differences between the estimates of Metcalf & Anderson and the city's witnesses, occur. In class C Lake Cheesman, the difference between Metcalf & Anderson and John Gaffy is $73,000, due largely to the omission of the portion of preliminary expense covering the work on the rock fill dam, which was incorporated in the final structure, amounting to about $35,000, the balance being in the difference in unit costs on the masonry. In the same class, the difference between the Metcalf & Anderson and the Bickel estimate is $129,348. Made up by the exclusion by Bickel entirely of the preliminary expense item that embraces that portion of the old dam included in the new, and in his estimate of the amount of rock to be quarried. The difference between the estimates of Metcalf & Anderson and the Public Utilities Engineers, *are* in the unit figures assumed and probably to partial exclusion of the items, called preliminary expense, but which include the old dam structure. The difference amounts to $83,801.

In Classes D to H South Platte river division, the difference between Metcalf & Anderson and John Gaffy amounts to $129,589. Of this amount approximately $18,000 was allowed by Mr. Gaffy in correction of the item of excavation on cribs. Almost the entire remaining difference grows out of the unit costs assumed for excavation and backfill on the conduits, and the expense of filter sand. In the same class the difference between the Metcalf & Anderson and Bickel estimates, amounts to $38,969 found in the difference in filter sand and quantities and cost in the construction of conduits. In this class the estimate of The Public Utilities Engineers, exceeds the estimate of Metcalf and Anderson by about 4%, difference occurring in the units costs assumed. As to the difference in the
1095 Bickel estimate it probably disappears as a result of the additions made by Mr. Bickel as shown in note four, for overhead costs and increase in excavation.

In classes I, J, & K, Bear creek division, Mr. Gaffy's estimate is about $66,511 below the Metcalf & Anderson estimate, due to difference in excavation and backfilling on conduits and excavation and embankments at Marston Lake. The difference between the Bickel and Metcalf & Anderson estimate is negligible. That between Metsalf & Anderson and the Public Utilities Engineers, amounts to $26,226 due to difference in unit prices.

In Class L, Cherry Creek division, the only important difference

is between Metcalf and Anderson and The Public Utilities Commission engineers, amounting to $167,488 mostly due to their exclusion of Sullivan Reservoir valued by Metcalf & Anderson at $159,505.

In classes M & N Mississippi Street galleries and West Denver pump station, the differences are trifling. In Class O Capitol Hill reservoir, the differences between Metcalf & Anderson and Messrs. Gaffy and Bickel, are in the cost of concrete lining and handling the earth work. The difference between Metcalf & Anderson and the Public Utilities Engineers, amounting to $76,706 is due to three things, difference in unit price for earthwork, and for concrete, and the omission, as I understand it, of a portion of the excavation for reservoir No. 2. This excavation difference being 20,800 cubic yards. Mr. C. P. Allen, testified that they had used the Metcalf & Anderson figures after checking them, so apparently the error occurred in transcribing the figures. In Class P Ashland Avenue reservoirs, the difference between Metcalf & Anderson estimates and those of Mr. Gaffy and the Public Utilities Engineers, arise from the exclusion by them of the asphalt lining in the reservoir, which should have been included in the reproduction cost and then depreciated. This exhibit is a comparison of reproduction cost undepreciated.

Exhibit A-99 shows the actual cost to the company of different parts of the plant and of materials, compared with the prices allowed for such parts of the plant and similar materials, by the different witnesses. The prices, given by the different witnesses, are on the sasme basis as treated in Exhibit A-98. The exhibit is divided into a series of tables, lettered A to H. Table A shows the prices paid for cast iron pipe by the company during the past ten years. Table B prices paid for cement during the past ten years. Below the tables, are stated the prices assumed by the various witnesses for the city. Table C shows the prices paid the Geddis & Scerie Stone Company for the construction of Cheesman Dam, by com-
1096 parison with the estimates submitted by the different witnesses for both the city and company for the reproduction cost of the dam with the excesses and deficiencies between original cost and the several estimates. Generally the treatment is the same as in the Exhibit A-98.

Item 6-*a* refers to the item entitled preliminary dam expense, in which, in the Metcalf & Anderson estimate, is incorporatd the cost of that portion of the old dam now a part of the present structure.

The item of water control, allowed by Metcalf & Anderson, in table C is allowed because it is the actual cost that would be incurred by anyone constructing that work, and was actually incurred by the company. That portion of the original dam that was incorporated in the present dam, was not included anywhere in the Metcalf & Anderson estimate, except under the title "Preliminary dam expense." It was impossible to ascertain from the company records the exact quantity of masonry involved in that work, but it was somewhere in the neighborhood of 30 feet in height. The item also contains the expenditures for excavation work that had been done,

test pits, to determine the character of material, opening quarry, etc. The money involved in this work was actually expended by the company in addition to the price paid Geddis & Seerie. The Metcalf & Anderson estimate of reproduction cost is approximately 9 3/10 per cent above the cost under the Geddis & Seerie contract. We having allowed $4.50 a cubic yard for masonry work as against $4.10 under that contract.

It has been my experience in the construction of works of this character that it is necessary to quarry rock to the extent of the entire contents of the dam in order to produce such a structure complete after the mortar is added. Table D refers to the South Platte River division. In Class E item 5-D an allowance of $1,200 for "abating ice in river and at dam site" is a necessary expense in connection with work in a stream that might be incurred either in handling water in summer, or ice in winter. It refers to the stream control necessary for such work.

Item 10-A-13 Class F South Platte River division, as set forth in Exhibit C, contains an error in the yardage in the foundation of the brick bunk house. The item should be $98 instead of $976. Item 8-H-5 Class F shown by Exhibit C should be eliminated as a duplication. The amount to be deducted is $3,456. Table- E and F of Exhibit A-99 shows the cost to the company of constructing the new roof at the Ashland Avenue reservoir to replace the roof broken down by the snow in December 1913.

1097 The actual cost to the company of concrete work in connection with this job was $11.01 per yard, to which in my judgment should be added 10% for overhead cost to make it comparable with contract figures, or making the cost $12.11 per yard. The actual cost of the roofing was 3.84 cents per foot board measure. 15% for overhead expense and contractor's profit added to this makes the cost on the contract basis 4.42 cents. With these costs are compared the estimates of reproducing the reservoir roofs as testified to by the several witnesses. Table G, Exhibit A-99, shows the actual costs, as nearly as they can be determined from the company's records, of the construction of the Capitol Hill reservoirs, compared with the estimated reproduction cost testified to by the different witnesses.

Table H is a statement of the cost of motor truck transportation in connection with the Los Angeles Water Works and with the works of the Spring Valley Water Company in San Francisco.

Discussion over admissibility of Table H. Table withdrawn by Mr. Dorsey.

Exhibit A-99 offered and admitted.

Referring to the allowances by Messrs. Gaffy and Bickel for the cost of placing sand in the slow sand filters, I believe that their estimates are too low, and that considerably greater expense would be incurred because of the methods necessary to be followed in placing this sand upon the filters. The various materials must be very carefully sized, washed and cleaned and spread over the beds in thin layers with uniform compression over the entire area in order that the filters will properly perform their function. It

cannot be dumped upon the beds and spread by mechanical appliances. It is not a question of simply depositing a certain yardage of material within a certain area. If the material is compacted more in one place than in another, as would result from dumping the sand into the bed, it will result in unequal rates of filtration and an unsatisfactory effluent from the filters.

Referring to the items in Exhibit A-98 dealing with the differences in the estimates of the cost of trenching and back-filling for conduits between Metcalf & Anderson and Mr. Bickel, the differences were produced largely by the fact that Mr. Bickel assumed the digging of a trench with vertical sides, instead of slopes. Sloped trenches are necessary as pointed out by Mr. O'Gara in his testimony, in order that the pipe may be properly built. The D. U. W. Co. uses extra clear lumber in its wood stave pipe construction.

Cement is used in large quantities in water works construc-
1098 tion. It is the practice in the large works with which I have had experience, to test the cement on the ground where the work is to be done and to provide special warehouses in which the different lots of cement received from the mill may be stored separately, pending the results of the tests, so that unsatisfactory cement may be picked out and removed from the work.

Such provisions for testing and storage are, in my judgment, necessary. Cement used for manholes and like structures need not be handled as carefully as cement for dams and structures of that character. Cement for manholes, however, represents a small percentage of the material used on the work. I consider 15 cents a barrel a fair allowance for the cost of handling, storing and testing the cement. That does not include the expense of taking the cement from the warehouse to the works, but simply means that the cement is ready for delivery to the works. I am of the opinion that trenching machines could not be used advantageously in the construction of the conduits, or in the distribution pipe system in the commercial or congested value district of the city. I believe they can be used in the outlying districts where obstructions are not material, where there is room for the work and where the material is advantageous. It is difficult to say what portion of the system could be built in that way. It might be anywhere from 30% to 50%. It has been my experience that trenching machines are not successful on wide trenches. Mr. Anderson and myself went into the question with a number of contractors who have used trenching machines in Denver, and formed our judgment as to the methods to be used, partly as a result of these inquiries. The average costs obtained through these inquiries, were in very close accord with the figures finally adopted by us. Trenching machines are not generally used by water works in this country.

Exhibit A-100 is a comparative table showing the estimates of the various witnesses as to the reproduction cost of the distribution pipe system of The D. U. W. Co. The estimate of Metcalf & Anderson being corrected as in the case in Exhibit A-98, in order to show the fair contract price for the reproduction of this system. The estimates of the other witnesses are as submitted in their exhibits

with such corrections as have been applied to make them conform with the figures finally adduced as a result of their oral testimony.

The first group of items compares the various estimates of excavation and backfilling, with allowances for difficult work, sheeting, etc. and the labor of laying and cost of lead and yarn, and cover the work that the contractor would do if he was furnished with the
1099 materials and there were no pavements and special obstructions to be met with.

In the case of Mr. Gaffy's estimate, I allowed 5% for overhead cost and profit on cast iron pipe and specials as estimated by him and have noted a reduction of $109,000 as the difference between the wages that would have to be paid in doing the work for a corporation and in doing the work for the city.

The second group of Exhibit A-100 shows the allowance in the various estimates for pavement, special crossings and other obstructions, with notes calling attention to the exclusion by some of the witnesses, for the city, of some of these items. The third group includes the estimates on the purchase of the materials necessary for the construction of the system. In order to make the Metcalf & Anderson figures comparable with the estimates of the other witnesses in this respect, there should be transferred from the general allowance for administration, engineering and contingencies, covering the entire plant, to this division of the plant, the sum of about $200,000 as representing the amount of such expenses as would be borne by the contractor directly in connection with the distribution pipe system. This segregation does not increase the total allowance upon the plant.

The Metcalf and Anderson estimate amounts to about $10,160 per mile of pipe; The Public Utilities engineers to $9,270 per mile; Mr. Gaffy, to $8,534 per mile, on the reduced labor scale; Ackert Bickel $8,660 per mile; Mr. Gordon, to $7,780 per mile, and Fremont Hill to $7,970 per mile. The Metcalf and Anderson estimate for excavation and backfilling alone is $626,589. Fremont Hill's estimate is $146,428. Mr. Hill assumes that he can dig and backfill his trench at an average price of 6½ cents a foot, the average price adopted by Metcalf & Anderson is 27.8 cents per foot.

The Metcalf and Anderson estimate for pavement is $539,558. The Public Utilities Commission engineers' estimate is about 10% less or $491,700. Mr. Gaffy's estimate about $100,000 less than the Public Utilities Engineers and Messrs. Bickel Hill and Gordon still lower. The three last mentioned used a narrower width of trench and made no allowance for the pavement and concrete footing overlapping the sides of the trench in order to give it solid bearing on old soil. Metcalf and Anderson, The Public Utilities Engineers, and Mr. Gaffy allowed for the cost of removing the pavement and replacing it. The other witnesses simply allowed for replacing it. It has been my experience over the country that it is customary to cut the pavement wider than the trench in order to give it strength from the support of the solid earth outside the trench.

In cities where that is not the practice you can see the depressions in the pavement where the trench has settled and let the un-

supported pavement down. Metcalf and Anderson obtained
1100 the information upon which they based the unit costs for the replacement of pavement by interviewing certain employes and officials of the D. U. W. Co., from examination of some of the vouchers with which they had paid the city for this work, by interviewing officials of other public utility corporations, and Mr. J. B. Hunter, City engineer. Mr. Hunter was interviewed December 9, 1913. There were present at this interview, Mr. Skouland, Mr. Anderson and myself. After the meeting I made a memorandum of what Mr. Hunter stated and submitted it to the other men to see if it was correct.

The memorandum is as follows: It is headed "Paving", with a marginal note on the right hand side "Hunter conference on backfilling and paving, December 9, 1913." (Reading) "Paving charges of City to Public Service Corporations in Denver, given at a conversation between Mr. J. B. Hunter, City Engineer, and Messrs. Anderson, Skouland and Metcalf. Mr. Hunter submitted the following schedule of prices governing the deposit required of public service corporations upon the street work done in the city. The city requires the corporations to backfill their trenches, in general, so as to get back into the trench all the material excavated from them, tamping them very thoroughly and then to lay a plank paving in the trench, in the case of cuts in asphalt, macadam (Bitulithic) and stone block, which is allowed to remain until such time as the city's contractor can replace the pavement, or until the city itself can do the work in case the contractor's guarantee has expired. The City requires in general that a concrete foundation for first class pavements should be laid to a width of twelve inches in excess of top width of trench and the present procedure seems to be to lay the pavement with its joint over the concrete joint, although Mr. Hunter expressed the view that in large work such as construction of duplicate mains it would probably be necessary to extend the pavement outside of the concrete joint a distance of three inches, more or less, on each side of the trench.

Asphalt on 6″ concrete base $3.00 per square yard.

(Macadam) plain $2.50 per cut, 5 feet long by 2 feet wide.

Stone (Sandstone Block) $2.50 per square yard.

Concrete (Portland Cement) 6 inches thick, $3.00 per square yard.

"Surfaced" 3 inches of gravel, sand or slag, $2.00 per cut 5 feet by 2 feet or 15c per lineal foot of trench.

Mr. Hunter also gave the following as the present city wage scale:

Common Labor, $2.50 for eight hours.

Two horse team and driver; $5.00 per eight hours.

Overtime 1-½ times scale.

1101 Mr. Hawes of The Denver Union Water Company office gives the following additional data concerning cost of paving charged by city:

Asphaltic concrete material, $3.00 per sq. yd.

Brick on 6-inch concrete base, $2.50 per sq. yd."

All of the witnesses except Metcalf and Anderson, excluded the

items of parallel tracks and corporation cocks in place, amounting to the sum of $249,960. Metcalf and Anderson base the price of cast iron pipe and specials upon average prices for a period of 10 years prior to the date of valuation. Public Utilities Commission Engineers based it upon a brief period prior to the date of valuation. The other witnesses practically upon present day prices. There are a few items in the schedules which it was impossible to segregate for the purpose of this comparison. They are of minor importance however.

Tables B-2 and B-3, of Exhibit A.100 give a statement of the method of arriving at the summarized results set forth wherever the testimony of the witnesses seemed to require it. This is offered so the defendants engineers can check my results going through the processes step by step when following my figures. Exhibit A. 100 offered and admitted.

The total of the Metcalf and Anderson estimate in Exhibit A 100, $4,333,412, differs from the total shown in Exhibit C under distribution pipe system, $1,874,262, because there is included in the figures in Exhibit C the company's overhead costs which are not a part of the fair contract cost.

Exhibit A 101 divided into tables A to G gives in detail the estimates of the several witnesses upon the cost of trenching and backfilling, per lineal foot, and the total amount for each size pipe from 3 inches to 30 inches in diameter. Table A is a summarized statement of all tables. Treatment of the overhead charges is the same as in Exhibits A-98, 99, 100. The comparison being the fair contract cost of excavation and backfilling. The average cost per foot of pipe for excavation and backfilling by the different witnesses is as follows:

Metcalf and Anderson 27.77 cents; Public Utilities commission engineers, 16.99; Mr. Gaffy, 13.87; Mr. Gordon, 10.33; Mr. Bickey, 14.77; Mr. Hill, 6.44.

There are some minor discrepancies in the distribution of the items of some of the witnesses because of the different methods adopted by them in arriving at their final results, but as ultimately worked out they are negligible. The detail of my processes in distributing Mr. Gaffy's figures are set forth in tables C and D. That in the case of Messrs. Gordon and Hill in tables E and F and in the case of Mr. Bickel, in table G. The figures as finally set out are substantially correct. Exhibit A 101 offered and admitted.

1102 Exhibit A. 102, is a similar tabulation showing a comparison of the estimates of pipe laying costs, including labor, lead and yarn, treated as the preceding exhibits, to reduce the estimates in all cases to the fair contract cost of doing the work, excluding any overhead cost of the owner or company but including the contractor's overhead costs and profit. The exhibit is divided into tables A. to F. and the analysis of the figures of the several witnesses is made in the same manner as in previous exhibits. The figures of all of the witnesses are very close, except Mr. Hill, who is substantially higher than any of the others.

Exhibit A. 102. Offered and admitted.

In my opinion it would be possible to find locations for the pipe in the streets that would avoid some of the obstructions that were considered by Metcalf and Anderson, but it would not be possible to avoid a great many of them. None of the right angle obstructions could be avoided. There is a possibility where there is much underground work that the efforts to relocate the pipe would result in greater expense than to lay the pipe in the existing location with the attendant difficulties because of a known obstruction. If you dig a new trench in close proximity to an old trench the material between the new trench and the old is very likely to slide in on you, involving the cost of much additional work. For that reason in the commercial districts where the streets have been dug up to a considerable extent it is difficult to find a location for pipe which will not involve as great expense as though the pipe were relaid in its present location. There are many sections in Denver where the multiplicity of pipes and obstructions which would be met in reduplicating, replacing or reproducing this system would be great.

The plates following page 388 of Exhibit C show the condition of street railroad tracks in certain streets and intersections where the obstructions and expense incidental thereto could not be avoided. In addition to the street railway tracks and water pipes there shown, there are located in those streets a multiplicity of other pipe conduits. In reproducing the water pipe system, much interference would be encountered from these conduits, such as telephone, steam heating, gas mains and sewers, which could only be avoided by laying the water pipe at greater depth and increasing the cost of excavation, backfilling, and labor in the laying of the pipe. In estimating the reproduction cost of a distribution pipe system or any other structure the effort is to reproduce the identical plant. Generally speaking it is the custom in cities to limit the distribution of construction material in the streets according to traffic conditions.
1103 In the congested districts the limit is very close and bridging and crossings must be maintained for the convenience of the public. In the outlying districts they will permit the distribution of more material, but in general within my experience the amounts permitted to be distributed are very much less than implied by some of the witnesses in this suit. It has always been my practice and the practice of contractors on work with which I have been connected, to have storage yards at which material may be stored on being unloaded from the cars and from which it may be conveyed to the works. I regard them as absolutely necessary. It has been my experience that it is very difficult to control the rate of delivery of material, and it is necessary to keep enough on hand to be perfectly sure that the work will not be interrupted. It is absolutely impossible, I believe, as a result of my experience, to obtain delivery of materials just as you need them. I have investigated the cost of transportation of materials by motor trucks and compared such costs with the cost of wagons and teams.

It is my judgment that a cost of 30 cents per ton mile of the haulage by motor trucks would be a much safer figure than the 20 cents stated by Mr. Gaffy, taking into consideration the conditions under

which material must be delivered on streets with trenches open and over country roads. I have investigated the matter through inquiry of a number of large concerns in the East that do a great deal of motor truck transportation and have come in contact with the matter on the works of the Spring Valley Water Company in San Francisco where they are using trucks in hauling materials to the Calaveras dam, in which case they operated the trucks 24 hours a day in order to keep down overhead costs. They were obliged to keep eight trucks in order to keep five in service. It is the experience of eastern concerns, that in order to maintain their transportation service they must keep sufficient horse equipment to handle their haulage over bad roads in bad weather. The trucks being used on the paved streets and under the most favorable conditions. Eliminating the added expense to them of maintaining an auxiliary horse equipment their average costs for motor truck haulage over paved streets and under the best conditions is almost exactly 20 cents per ton mile, as testified by Mr. Gaffy would be the rate for construction work here. Generally these records were the records of trucks that had been in service from one to one and one-half years, so were practically new and had been operating a minimum cost for repairs. As the trucks age and necessity for repairs increase, this cost would increase. Some of the costs ran up to 29 cents per ton mile.

1104 In estimating the reproduction cost of this system, Mr. Anderson and myself contemplated the use of motor trucks in delivering part of the materials, and we took that use into consideration in arriving at our prices. I will present a tabulation showing the cost of motor truck hauling, as ascertained by me, in other cities. I don't think that Mr. Gordon could have meant that the cost of laying distribution pipe systems in other cities was one half of 45 cents per foot, excluding the costs of materials. I think that allowance is totally inadequate to cover the cost of work in cities of which I have known or ever heard of. In order to arrive at gross reproduction cost of this property to the company it is necessary to add to the contract costs, set out in Exhibits A98 to A102, the valuations on class A lands, Class B water rights, Class T personal property, stock and material on haul. Also, an allowance for the company's costs in connection with the physical structures and other items, for engineering, preliminary investigations, administrative costs, and for such contingencies as arise in connection with such work. These latter items grouped together, Metcalfe and Anderson, have assumed would involve a cost of approximately 12½ per cent on top of the cost heretofore stated. To the sum of all these items should be added the cost of interest during construction. This charge to be distributed according to the average period of construction necessary for the several units of the plant.

In addition to that there is the item of preliminary expenses, organization, incorporation, etc. covering the work of those who were planning the project and getting it under way, to the extent that the work preliminary to construction, could be commenced. These costs might include the expense of negotiations with the city looking toward the securing of the right to occupy the streets.

Finally there is to be added the item of going concern value, which covers in general the cost of developing the business. Having found the grand total there must be deducted the amount of the accrued depreciation upon the structural property included in the valuation. This item of depreciation is independent of abandoned property that is not included in the schedule. At page 64 of Exhibit C are shown the allowances made by Metcalfe and Anderson for preliminary expense and organization, interest during construction, and going concern value.

I heard the testimony of the several witnesses for the defendants with regard to the reasonable construction period for these works. Those periods, in my opinion, are not reasonable or justified by general experience in water works construction. Assuming that the structures would be built within the period stated by the defendants' witnesses, the cost would be substantially more than the
1105 cost estimated by Mr. Anderson and myself. And would more than offset the saving in cost for interest during construction assumed under the longer period.

The overhead cost of mangement, etc., may also be greater even though the period be shorter, because of the greater number of men and greater expense that would be involved by doing the work in a much shorter time. It is my judgment, that on the shorter period of construction, assumed by the defendant's witnesses, the increased cost of the work would exceed whatever saving might be made by the shorter period in respect to the interest during construction. Exhibit A-103 is a summary of the actual construction periods consumed in building the more important structures of the D. U. W. Co. It is based upon the best information that I was able to obtain from various employes and officers of the company. This tabulation does not give much information on the period necessary for the installation of the distribution pipe system, because most of it has been built as what might be called piecemeal constructoon. In the case of the Cheesman Dam and certain other structures, the conditions were similar to those which in my judgment would actually prevail under reproduction conditions. The first work in connection with the location of Lake Cheesman was done in 1892. From 1892 until 1898, 2 years and eight months of actual work was done in connection with acquiring the reservoir site from the government, making plans and surveys, preliminary to construction, and getting rid of the claims of other persons to lands within the reservoir site.

Between 1898 and 1900 there was done approximately 19 months of actual construction work on the rock filled dam, and from 1900 to 1904, four years and 4 months of actual work in making plans and building the present structure. Part of the work done on the rock filled dam was wasted when that dam was washed out. The four years and more of actual work on the construction of the present dam followed the preliminary construction work done by the company in connection with the first dam, which still remains in the structure. Sheets B, C, and D, show in greater detail the activities during the several periods.

Sheet E gives similar information concerning Marston Lake. The total period there involving 7½ years which could have been cut in two under reproduction conditions. The construction of the slow sand filters actually covered a period of approximately 2 years. The Platte Canon reservoir, 1 year, Capitol Hill reservoir, 1 basin 9 months, the other 1 year. Sheet F gives similar data for the Ashland Avenue reservoir and the conduits up to No. 7. Sheet G conduits 8 and 9.

1106 The only record of considerable work on the distribution pipe system occurs in the year 1890, when from January 2 to November 10th, the American Water Works Company laid approximately 99 miles of pipe from 2 inches to 48 inches in diameter. In arriving at the assumed period of construction Mr. Anderson and myself made use of all such records of construction as were obtainable from other cities, where extensive work has been done. Among them, Cincinnati, Louisville, New Orleans. Amended table H, Exhibit A-99, substituted for Table H, originally presented.

We have reduced the figures to the average number of months required to spend a million dollars on such works as these. The record shows that a fair average rate of progress corresponds to the expenditure of about 1 million dollars per year. In the case of Cincinnati, construction began in the fall of 1897, completed in 1909, 12 years. The expenditure was, $11,457,500. In New Orleans where substantially an entire new plant was built, construction began in May, 1905, completed December 31, 1913, 8 years and 7 months. The total expenditure being $8,967,240. I think that is a fairly comparable record for the reason that we know the construction was pushed with vigor, because you will remember they had had a yellow fever epidemic and the water supply was derived almost wholly from cisterns and they were considered a menace to the health of the community. In the large works in New York's new water supply, it has taken from six months to seven months to spend a million dollars on different pieces of work.

Generally it may be assumed that it will require one year's time to expend a million dollars. In a situation like Denver where the work is more or less scattered with the dam at one end of the line, and structures, involving several million dollars, that could be carried on collaterally, I have assumed a 5 year period of construction for the entire works. If that had all been within the city limits of Denver I should have lengthened it to a period of from approximately 9 to 10 years of time. In view of the actual periods of construction devoted to building the structures constituting this plant, it is my opinion that the figures submitted by Mr. Cheyne in Exhibits Z, and A-54, do not contain all of the expenditures that have actually been made upon these structures. They are substantially accurate for the years covered by them, but much of the construction work on this plant was done by predecessors of The D. U. W. Co. and not included in the statement.

Generally in the distribution of the items in The Metcalf & Anderson valuation, the classification is the same as in Mr. Cheyne's Exhibits Z and A-54, but the limits of the work involved are quite

different. In conduit installation Mr. Cheyne's figures in-
1107 clude the connections made to the conduit and all such items, while our classification drops the conduits at the special, by means of which it is connected to the other pipes. For these reasons it is absolutely impossible to obtain from the company's records the actual original costs of the different items involved in the plant.

The figures that I have submitted of original cost, cover, I think, all such items as can be segregated, except possibly some of the conduit lines which I had not the time to work up, but which, because of the fact that the witnesses for both sides are so nearly agreed, are of less importance than the other figures. I do not believe that the public would tolerate the conditions that would develop in the city from an effort to install the distribution pipe system in a period of from 2 to 3 years. If it did, such precedure would increase the cost substantially above the figures assumed by us.

I do not believe that the entire plant could be reproduced in a period of three years, portions of it could, but the whole plant could not. And certainly not at the figures assumed by us. Overhead charges to the company should represent a proper percentage of the total cost of the works to the company and not the cost of the works to the contractor doing the work. Contractor's profit is a cost to the company. To determine the amount of interest during construction it is necessary to first determine the reasonable period in which the works can be built. Generally, if that reasonable period is reduced with a view to saving the interest charges, the reduction in time results in increased actual cost of construction that more than offsets the saving effected. Interest charge against any part of the plant runs from the time construction work is commenced on it until that part of the plant goes into service. It does not necessarily stop when the structure is completed, if it is completed in advance of being put into service. In my opinion, it would not be possible in financing such a project as water works construction, to arrange to get the money in semi-annual installments, as the work progresses. General experience has been that the money must be gotten at the inception of the project, though in some large works where the period of construction has been long, and the amount involved large, the money has been obtained in two and three installments.

The capital furnished is drawing interest all the time. If the interest during construction is offset by allowance for interest received by the builder on money in the bank awaiting investment, that treatment would very largely increase allowances for going concern value. In determining the going value we have made deductions for the items of interest during construction allowed. If you con-
1108 sider that interest during construction is offset in a measure by interest on bank balances, the going concern value must be increased by the amount that we have deducted for the allowance which was made for interest during construction. Essentially our deductions for depreciation were based upon actual examination of much of the existing property to which depreciation was applied, then certain methods of computation were used as an

aid to judgment. It is impossible to determine depreciation on the basis of any rule or system laid down without a careful inspection of the property and a modification of such rules to meet existing conditions. The witness Hill, in his depreciation table, exhibit 68, has given no consideration to the actual conditions which exist in this plant and which largely modify the result of his computation.

The use by him of the two and one-half per cent sinking fund method is not in my judgment a fair method, though it is used by some engineers in the middle west in connection with very long lived property. The same engineers use a four per cent rate on shorter lived property. Their theory being that on property having a life of 100 years, the lower rate is justified because banks would not care to allow the larger rate for such a long period of time.

The extent of depreciation that has accrued, must be determined first and foremost by an actual inspection of the plant. In our depreciation allowance for the future, we based our estimate on the sinking fund method with a four per cent interest rate. If the interest rate were reduced the depreciation allowance to be set aside each year must be increased so that the same total sum will be available at the end of the useful life of the property. I have not estimated what the additional allowance would be at the lower rate, but it would be much greater. For example, on property having a life of 20 years, you set aside annually under the 4% method, $3.35 for each $100, value of property; on the 2½% basis you set aside $3.91 per year. On property having a life of 40 years, you set aside on the 4% basis, $1.05 per year for each $100; on the two and one-half per cent basis you set aside $1.48, or nearly 50% more. On a life of 60 years, the four per cent basis requires 42 cents on each $100, and the 2½% basis requires 74 cents. I do not believe that the "straight line method" of computing depreciation, is as significant as the "sinking-fund method." At any rate it is more applicable to short life than to long life property.

The assumption as to life of the property in question makes a very material difference in the annual allowance for depreciation. I believe that Mr. Hill, in his table, has very much underesti-
1109 mated the probable life of the conduits and the cast iron pipe system, particularly. If the water power pumps at the West Denver station were eliminated, it would be necessary to substitute other pumps to do the work that they are now doing. I would not advise the elimination of those water power pumps.

Exhibit A-104, tables A to E, is a computation on the subject of going value or development expense, dealing with the subject upon the assumptions that were made by Messrs. Van Diest and Fellows, in their testimony. As I understand their method, it is a modification of the method of the Wisconsin Railway Commission, or what might otherwise be called, the equal annual payment method with certain assumed construction or investment costs.

"The theory may be described in this way: It is assumed that it is desirable to lay aside a depreciation allowance of such magnitude that it will meet the losses in abandoned and replaced property, in any given term of years, and that the allowance shall be so made

within that period of years that it, added to the average repairs, as covered by operating expenses and the fixed charges upon the capital sum, which I will define in a moment, but which in a general way represents the investment, shall be uniform year by year throughout that period of time, assuming that no additional construction is undertaken; and assuming, further, as we understand the law to be, that the returns shall be predicated upon the depreciated value of the property. Now, assuming in any plant that no additional construction is made during any period of years, it is obvious that, year by year, the capital sum or the investment is decreased by the amount of the depreciation which takes place upon that plant. Therefore, year by year, the amount of money which must be raised through the agency of the rates to cover the profit item, or, in other words, to cover the fair return upon the depreciated value of the property, will decrease; therefore, if your rate of payment is to be uniform on the part of the public to the corporation, throughout that period of years, the depreciation allowance would have to increase correspondingly. That is advantageous, because, during the early years of the formative period of the plant and acquisition of its business, the paying of a depreciation allowance is burdensome to the rate payer and the corporation, whereas, when the business is well under way, the payment of an increased amount is not so burdensome as would be the payment of a uniform amount throughout that entire period of time. That is the general theory of this method of computation. The capital sum is then arrived at in this way: starting on the first year of operation, you have the fair investment cost of the property as of that date; you assume then
1110 that you were entitled to earn upon that fair investment cost a fair rate of return; in addition to that, the allowance for depreciation figured according to the method stated; and I may say in passing that the result is that you get a sinking-fund depreciation rate. You are entitled, it is assumed, to earn also the operating costs and the necessary repair account, taxes and so on. The sum total, then, of those provisions is deducted from the actual gross revenue of that year. If there be a deficit, the deficit is added to the capital sum, and the capital sum of the second year becomes the investment cost of the first year, plus the deficit. If there is an excess, it is subtracted from the investment cost on the theory that the excess repays to the owner a portion of his capital sum. In each year, you see, you deduct, however, from the capital sum the depreciation allowance, and figure your fair return upon the depreciated value of the property. Now, there is one other requirement, which I think Mr. Fellows must have overlooked, and which is the most important criticism that I would make of his computation—assuming the assumptions which are made by him in regard to the investment cost to be admitted—and that is this: the total allowance in the depreciation fund during the entire period covered by the computations must be sufficiently large not only to cover the accrued depreciation upon the existing property, but must take care of the property abandoned during that interval of time."

Mr. Fellows' annual depreciation allowance should be materially increased.

Table C shows the result obtained under the method outlined by Mr. Fellows, applied to the conditions that actually have existed with reference to the property of The D. U. W. Co. for the year 1914 under this method, assuming that 7% represents a fair rate of return, the gross revenue of the plant should be $1,416,725, allowing approximately $500,000 a year for operating expenses and taxes; $284,193, for the year, for depreciation allowance under the method assumed by Mr. Fellows, and $633,532, as a fair return at the rate of 7% upon the investment cost of the property shown at this time. The depreciation allowance set forth in Table C is based upon the "sinking-fund-method," at 0.95% per annum, which results in a development expense allowance of $711,000., and the investment cost of the property, less depreciation, $9,036,000. In Table- B and D, the same method of computation is used except that depreciation is based on the "straight-line-method." Table D shows that the development expense at the end of the year 1913, amounted to $3,672,560, and the capital sum was $14,598,374. That the fair gross revenue for the year 1914 under these conditions should be $1,732,103, comprising a depreciation allowance of $210,-
1111 217, operating expenses and taxes $500,000, and a fair return at the rate of 7% on the capital sum $1,021,886.

In Table E is shown a similar computation based again on the "sinking-fund-method" of handling depreciation, as was the case in Table C, but on a basis requiring an annuity of 8/10 of one per cent per annum for depreciation, instead of 95/100 of one per cent as assumed in Table C. On this basis the equitable gross revenue for the year 1914 is $1,834,322. The increase above Table D being due to the higher allowance necessary to provide for depreciation.

Exhibit A-104 offered and admitted.

Exhibit A-105 sets forth the estimated cost of the new construction now being done in connection with the 48-inch pipe line from Marston Lake to the City, together with an estimate of the increase of operating expenses that will result from this addition to the plant. This work was planned and work leading up to the construction was actually under way prior to May 1, 1914. Objection to admitting Exhibit A-105 sustained.

I have examined Exhibits A-73 and A-74, presented by Mr. Cheyne, particularly as they relate to operating expenses. In my judgment the operating expenses there set forth are reasonable and proper expenses and properly charged.

Cross-examination by Mr. Nye:

It is true that the item entitled "preliminary dam expense" included in the valuation by Metcalf & Anderson, and excluded by other witnesses, contains the cost of the steel that was used in the construction of the first dam and which was incorporated with the masonry included in the present dam. It is impossible to ascertain the exact amount of that, I think not over $10,000 perhaps less.

The dam could have been built without the steel, but I would not say that it is of no value in the dam.

The estimates of Messrs. Gaffey and Bickel, included Sullivan Reservoir in the gross reproduction cost. The Public Utilities Engineers did not. It is my understanding that in estimating paving allowances Mr. Gaffy and The Public Utilities engineers allowed for pavement cuts wider than the trench.

"Correction of minor errors in setting down some of the figures in Table G, Exhibit A-99. In Exhibit A-100," the figures setting forth Mr. Gaffy's estimate for excavation and backfill, were difficult to compare with our figures because he gave first his estimate of the cost of ordinary excavation and backfill and subsequently included under one item, an estimate for difficult excavation and
1112 sheeting, all combined. In making my comparison, as I stated on direct examination, I left out of consideration the item of the sheeting and the difficult trench. Including that with the straight excavation brings the average cost per lineal foot of trench under Mr. Gaffy's estimate to 16-2/3 cents.

It is apparently also true that Mr. Gaffy's estimate considered in Table C, Exhibit A-102, treated separately the item of laying specials and valves, for which correction should be made.

The corrections made in these two exhibits, should be carried into the units in Exhibit A-100. They do not affect the final footings at all, but merely the distribution as between the several classes of the work. By the fair contract cost, I mean such a price as you would get on work after fair competitive bidding upon specifications prepared in advance of the bidding so that the bidders might bid on the same basis and under present-day conditions at normal prices. The costs so arranged for each of the segregated items, that each item bears proportionately a proper relation to every other item in the general construction. In the estimate of The Public Utilities Engineers, the average cost assumed for laying 12-inch pipe was less than the average cost assumed for laying ten inch pipe, due as set out by defendants' Exhibit 28, to a consideration of the localities in which each of the different sizes of pipe was to be laid, and their judgment of its cost under that consideration. In my original estimates of present fair value, set out in Exhibit C, I included both the contractor's overhead costs and profit, and the company's overhead and contingencies.

In the preparation of the exhibits here introduced, dealing with the fair contract price, I eliminated from the figures shown in Exhibit C, the company overhead and contingencies. It was my intention to make the Metcalf and Anderson perfectly comparable with the other estimators.

I have undertaken to make a determination of the relative cost of operating the water power pumps at West Denver and of pumping the same quantity of water by steam with new pumps. In actual money expended for operation it costs the company less to operate the water power pumps. If you consider the overhead charges due to the property necessary in connection with the water power instal-

lation plus the operating expenses, then the total cost of pumping by water power is more expensive.

I do not know what the exact difference would be, but I can and will prepare a memorandum showing it.

If the plant were reproduced at present-day prices but under the conditions existing at the time the original structures were built, it would reduce the allowances for such items as paving,
1113 some track obstructions, and some other pipes and conduits now existing under ground and under which water mains would have to be laid.

Cross-examination by Mr. Stevens:

The cross sections showing the conduit trenches used by the D. U. W. Co. call for a width at the bottom of the trench 2 feet greater than the internal diameter of the pipe, and with sloping sides. On the vertical trench assumed by Mr. Bickel using a width 28 inches greater that the internal diameter of the pipe the gain in the very small triangle at the bottom of the trench would be infinitesimal compared with the deficiencies in his trench quantities due to the gain in the large triangle in the upper part of the sloping trench. The D. U. W. Co. has not kept a separate depreciation account or maintained a sinking fund to take up depreciation.

1114 Witness THOMAS CHEYNE, recalled.

Direct examination by Mr. Dorsey:

Exhibit A-107, is a table showing earnings and operating expenses of The D. U. W. Co. for the fiscal year ending October 31st, 1914. Also an estimate of the net earnings of the company for the year beginning May 1, 1913, ending April 30, 1914, as the result would be, as nearly as can be ascertained, had the rate reduction ordinance been in effect during that period. The estimate is based upon the experience of the six months season, May 1, to Oct. 31, 1914, with the effect of the rate reduction ordinance applied to the business of that period and carried forward to the following six months period. Estimated reduction in gross earnings for the year ending April 30, 1915, had the rate reduction ordinance been in effect is $271,485.32.

In preparing the estimate of the reduction, under the proposed ordinance, I have made an actual count and computation of the items, appearing on the service records of the company, from which the revenue is obtained, which results in a correction reducing the former estimated reduction by $47.52. I have ascertained that the amounts charged by the company to maintenance and repair accounts are proper charges to such accounts. The items marked C. D. and E., are items of an extraordinary character which in my judgment should be charged to depreciation account or contingent reserve fund, were such funds available. I have examined the company's records for the past five years and find that except for these matters, to which I have called attention, that there are no charges to maintenance account that should not properly be made to such account. The aver-

age annual charge to maintenance for the five years is $60,767.68 per year.

Exhibit A-108 shows the expenditures for maintenance and repairs for the years 1910 to 1914, inclusive.

Exhibits A-107 and A-108 offered and admitted.

Cross-examination by Mr. Stevens:

All of the repairs and replacements made by the company in this period are shown by this exhibit. The replacement of the Ashland Avenue Reservoir roof is not properly chargeable to new construction. It is a proper charge to operating expense, there being no depreciation fund from which to care for it.

Cross-examination by Mr. Nye:

In the beginning of my work I went over these records of the company from the beginning. I found no other case where large
1115 replacements were charged to operation and maintenance accounts. The Cherry Creek conduit, being entirely new construction was charged to property account. There was no depreciation fund against which to charge any part of the cost of the abandoned Cherry Creek pipe line. There was another item, the replacement with cast iron of 420 feet of the 40 inch conduit, which was partly replacement and partly betterment. The replacement should have been charged to depreciation account had there been one. Those are the only items of that character that I recollect. The exact point of division between proper charges to maintenance and operation, and to depreciation, is a question of judgment. The operation and maintenance account has been a steadily increasing account since the beginning of the life of the company.

Legal expenses in the statement are separated from the expenses attached directly to the rate case, the rate case expenses being considered as extraordinary expenses. In the case of the railroad using water through meters at a rate of 6 cents per thousand gallons, I computed the earnings from them in the future at the rate of 6 cents, though under the ordinance the company may charge 8 cents. I did not anticipate that the company would be able to change the existing rate. If the rate were increased to 8 cents, the earnings of the company would be increased by $13,017.38 and the reduction provided by the ordinance would be reduced to that extent. In using the figure, $170,000, for depreciation and contingent reserve, I simply adopted the estimates of the company's engineers.

Redirect examination by Mr. Dorsey:

The company has not, since 1894, carried a replacement account. The property account as shown and carried on the books and records of the water company, aggregates considerably more than $16,000,000.

In addition to the railroad companies, the Union Stock Yards Company and the Phipps Sanatorium, are served with water at a rate of 6 cents per thousand gallons, which would make the total correction, under the meter account, if the 8 cent rate made possible under the

ordinance were collected, $16,560.40 for the year ending December 31, 1914. The 6 cent rate, in the case of these large consumers was in effect prior to the adoption of the rate reducing ordinance and has remained in effect since. The Phipps Sanatorium is a semi-charitable institution.

1116 Witness LEONARD METCALF Recalled.

Direct examination by Mr. Dorsey:

Exhibit A-12, offered and admitted. I have made an analysis of the repair account of The D. U. W. Co., and am satisfied that the charges thereto are normal charges. I did not intend that the allowance made by me for depreciation and contingent reserve should cover items of ordinary repair expenses. If no fund is provided out of which extraordinary expenses may be paid, they also must be charged to operating expenses. They cannot be charged to property account.

Property contained in a water works system is generally much longer lived than the property of gas and electric plants, street railways and other utilities, and this feature has a very important bearing upon the element of depreciation. The rate of depreciation is much less in the early years of the property than in the later years, therefore, the sinking fund method of computing the allowance necessary, is the most nearly accurate. It provides for small annuities, compared with the straight line method, that with accretions produce a larger allowance year by year as the end of the useful life of the property is approached. The accretion under the sinking fund method grows constantly by the compounding effect of the interest thus more nearly keeping pace with the depreciation upon the property. Banking houses usually require in providing for loans that the earnings available for the payment of interest shall amount to at least one and one-half times and from that to two times, the amount of the interest charge actually represented by the coupons attached to the securities in question. Unless such funds are available for payment of interest the rate at which the money is obtained exceeds very considerably the rate fixed by the security.

Cross-examination by Mr. Stevens:

In determining the depreciation that had accrued upon the various items of property, I based my judgment upon experience. In determining the depreciation allowance for the future judgment was relied upon as to the remaining useful life of the property and the computation to ascertain the annuity required to amortize the property was made upon the sinking fund method with a 4% interest rate. The straight line method and the sinking fund method were both used as aids to judgment in checking the estimate of accrued depreciation.

It would make no difference in my allowance for depreciation of this plant, if I were making the estimate to apply to the case of a company that had just taken over and was just beginning to
1117 operate these works. The estimate would be exactly the same as in the case of the present company. Whether the

company had or had not a franchise makes no difference in the depreciation upon the physical property. If a franchise existed limited to a certain period, if I included any value for its existence, I would also depreciate it according to the life provided for it. If it is to be assumed, as Senator Patterson indicates, that this property is to be scrapped when the city completes its new plant and takes over the business of this one then it would be equitable for this company to increase its rates to amortize the value remaining in this plant within that period.

Cross-examination by Mr. Nye:

It would make comparatively little difference in the annual allowance now required to amortize the remaining value in this property even though depreciation allowance had been made and a fund provided during the past operations of the company. For the purpose of this valuation, the property has been depreciated up to the date of valuation. The depreciation allowance made is not intended to take care of ordinary repairs to pumps, conduits, or works of that kind. The question of what items are to be charged to repair account and what items are to be charged to depreciation account is a matter of judgment. The judgment to be applied when the work is done. If the repair is of a character that will extend the life of the portion of the property repaired, only up to the point where it will make the structure serve until such time as the whole structure is abandoned, I would charge that to repair account. If the repair provided a structure that would extend the life of the portion repaired to such an extent as to make that work serve as part of the final replacement, I would charge it to depreciation account. The items charged to maintenance and repairs as shown by exhibit A108, are properly charged to repairs. If a company borrowed, at a certain rate of interest, up to three-fourths of the value of its property and attempted to borrow further, it would be obliged to pay a higher rate of interest. It makes no difference whether the additional capital was obtained from its stockholders or from the public at large.

The pumps of the West Denver station were depreciated 47%. It is my judgment that the water power pumps were depreciated more than the steam pumps though at this moment I cannot lay my hand on the data from which to state the relative allowance.

1118 Redirect examination by Mr. Dorsey:

The allowance for accrued depreciation was made from judgment, after a careful examination of the property depreciated, which examination determined the extent to which depreciation had occurred and informed us as to the remaining useful life of the property, thus enabling us to determine the rate of depreciation to be allowed for the future. I stated on cross-examination that had a depreciation fund been set aside in the past a slightly smaller annuity might be sufficient at the present time. This is due to the fact that the company would have on hand an accumulated contingent reserve fund, possibly as much as $200,000, which accumulation would affect, but not substantially, the requirements for the aggregate of the

two allowances; depreciation and contingent reserve. In water works properties the depreciation replacements occur at long intervals, because the bulk of the investment is in long lived property. The time for large replacements has not yet arrived in this plant. I believe that the allowances which I have made for depreciation and contingent reserve in this case will be justified by experience.

Witness ARTHUR D. WALL. Recalled.

Cross-examination by Mr. Nye:

The Antero and Lost Park Reservoir Company in acquiring its reservoir site purchased two direct flow ditches. The Drake Ditch, priority of Oct. 10, 1881, 6.27 feet, and the Chubb, priority June 1, 1884, 91.52 second feet, that being an outlet ditch from Greene's Lake (which is part of the reservoir).

Redirect examination by Mr. Hodges:

These ditches had been used for the irrigation of hay meadows.

Sur-rebuttal by Defendants.

Witness A. LINCOLN FELLOWS. Recalled.

Cross-examination by Mr. Dorsey:

Exhibit A106, is a copy of the report made by the engineers of The Public Utilities Commission to The Public Utilities Commission, January 16, 1914. Exhibit A106, offered and admitted. Objection overruled. Exception. The report was made, fixing a valua-
1119 tion as a basis for purchase of the plant of the company and not for rate making purposes. The report stated in effect, that if such purchase was made, little or no change should be made in the rates.

Witness HORACE HILTON MITCHELL.

Direct examination by Mr. Stevens.

Reside at Colorado Springs, am a certified public accountant. Was designated by the Master in this case to make an examination of the books of the D. U. W. Co. Exhibit 72, is my report of the result of said examination.

Exhibit 72 offered and admitted.

Cross-examination by Mr. Dorsey:

I find that because of a rebate claim that was allowed to the City of Denver, on account of charges in meter rates for the years 1911 and 1912, that the meter revenues for the year 1913 should be increased by the sum of $9,366.06 and a profit and loss entry should be made to compensate for the increase, leaving the net earnings of the company exactly as shown by Mr. Cheney's estimates in Exhibits A73 and A74. I also find that Exhibits A73 and A74, should be corrected by increasing the reduction developing under the rate

reducing ordinance by the amount of $392.48 and the net earnings be reduced by the same amount, because of the fact that Mr. Cheyne in preparing Exhibits A73 and A74 based his estimate upon the number of items producing a certain class of revenue for which charge was made in the year 1913. The actual count of those items for the year 1914 altering the result to that unappreciable extent.

The amount involved is against the interest of the company.

It was stipulated and agreed by and between counsel for the respective parties that all exhibits not excluded by Master, even though not formally offered in evidence during the hearing, be considered as offered in evidence.

1120 COMPLAINANT'S EXHIBIT No. E.

Case No. —.

State of Colorado.

Office of the Secretary of State.

Certificate.

UNITED STATES OF AMERICA.
State of Colorado, ss:

I, James B. Pearce, Secretary of State of the State of Colorado, do hereby certify that the annexed is a full, true and complete transcript of the Certificate of Incorporation of The South Platte Canal & Reservoir Company which was filed in this Office the Thirteenth day of January A. D. 1894 at 2:15 o'clock P. M. and admitted to record, also

Certificate of Amendment to The Certificate of Incorporation of The South Platte Canal & Reservoir Company which was filed in this Office the Twentieth day of April, A. D. 1914, at 9:59 o'clock A. M. and admitted to record, extending the Corporate Existence.

In Testimony Whereof, I have hereunto set my hand and affixed the Great Seal of the State of Colorado, at the City of Denver, this twenty-ninth day of May, A. D. 1914.

(Colorado State Seal.) JAMES B. PEARCE,
Secretary of State.
By THOMAS F. DILLON, JR., *Deputy.*

1121 *Certificate of Incorporation of The South Platte Canal & Reservoir Company.*

Know All Men By These Presents: That we, David H. Moffat, Walter S. Cheesman, Thomas S. Hayden, Charles P. Allen and Richard Holme, desiring to form a company under the name and for the purposes hereinafter mentioned, in accordance with the laws

of the state of Colorado in such case made and provided, do hereby make, sign and acknowledge in sextuplicate this certificate of incorporation, and as required by the said laws of Colorado, we herein make the following statements:

1st. The name of this corporation shall be The South Platte Canal & Reservoir Company.

2d. The object for which said Company is incorporated and organized is, in the Counties of Douglas, Jefferson, Arapahoe and Weld, in the state of Colorado, to construct, maintain, operate and enlarge, purchase, receive, hold, sell, grant and convey reservoirs, canals, tunnels, pipe lines, water pipes and water mains, for the purpose of conveying water to be used for irrigating, domestic, sanitary, fire, mining, manufacturing and mechanical purposes, and all rights, privileges and franchises belonging to or to be acquired by the same; to appropriate water, water rights, franchises and privileges; to sell and otherwise dispose of water and the right to the use of water for the purposes aforesaid; to construct, maintain, enlarge, purchase, receive, hold, sell, grant and convey all necessary or convenient lateral ditches, tunnels and pipe lines; to sink wells, cribs and underground galleries for collecting water; to acquire rights of way for its reservoirs, ditches, canals, pipe lines, tunnels, water mains, laterals, cribs and galleries; to furnish and sell water to water works companies and to irrigating companies; to sell and supply the city of Denver and additions thereto, and towns
1122 and cities in the vicinity thereof, and the inhabitants thereof and others in the vicinity and all municipalities and the inhabitants thereof, and all corporations and individuals along the line of its canals, ditches, pipe lines, water mains, and water pipes with water for the purposes aforesaid; to purchase, receive, hold, sell, grant and convey real and personal property; to improve and cultivate lands; to construct houses and buildings; to aid by advances or loans of money in the development, improvement and cultivation of farms; to borrow money; to assume any indebtedness upon property said company may purchase; to issue bonds secured by deeds of trust or mortages upon any or all of its property; also to construct, maintain and operate a reservoir at the intersection of the South Fork of the South Platte River and Lost Park Creek, and a tunnel, canal and pipe line to convey water from such reservoir and the stream known as the South Platte river for the purposes aforesaid; and to adopt the bed of the South Platte River as the canal or channel for the purpose of conducting said waters to any other canals or pipe lines in the Counties of Douglas, Jefferson, Arapahoe and Weld in the State of Colorado.

3d. The said reservoir is to be constructed by said company on the South Fork of the South Platte River at its intersection with Lost Park Creek in Jefferson and Douglas Counties, Colorado. The dam of such reservoir is located in the N. W. ¼ of S. W. ¼ of Section Six (6), Township Ten (10) South, of Range Seventy (70) West, the north end of which will be from the N. W. corner of said Section Six (6) South, 11° 25′ E., 2,832 feet; thence S., 22° 40′ E., 473 feet to the south end of said dam. Said reservoir at high water

mark, will cover so much of the following legal subdivisions of land as lie within the canons of said South Fork of the South Platte River, Lost Park Creek and Turkey Creek, in Douglas and Jefferson Counties, Colorado, towit: 13.5 acres in the N. W. ¼ of S. W. ¼, 12.5 acres in W. ½ of N. W. ¼ of said Section 6, Twp. 10 S., R. 70 W.; 33.9 acres in the S. E. ¼ and 17.7 acres in S W. ¼ all in Section 36, Twp. 9 S., R. 71 W.; 1.. acres in S E. ¼ of S. E. ¼ of Sec. 35, Twp. 9 S., R. 71 W.; 94.6 acres in N. E. ¼ of
1123 Sec. 1; 8.4 acres in N. W. ¼ of Sec. 1; 2.7 acres in N. E. ¼ of N. E. ¼ of Sec. 2; 105.3 acres in S. E. ¼ of Sec. 1; 15.8 acres in S. W. ¼ of Sec. 1; 64.8 acres in N. E. ¼ of Sec. 12; 63.2 acres in N. W. ¼ of Sec 12; 8 acres in S. E. ¼ of Sec. 12; 73.1 acres in S. W. ¼ of Sec. 12; 90.4 acres in N. W. ¼ of Sec. 13; 2.4 acres in N. E. ¼ of N. E. ¼ of Sec 14; 61.2 acres in S. W. ¼ of Sec. 13; 7 acres in S. E. ¼ of Sec. 13; 29.7 acres in S. E. ¼ of Sec. 14; 29.6 acres in N. E. ¼ of Sec. 23; 3.4 acres in N. W. ¼ of Sec. 23; 4.9 acres in S. W. ¼ of Sec. 23, all in Township Ten (10) South, of Range Seventy-one (71) West of the Sixth (6th) P. M. The total number of acres covered by said reservoir at high water mark is seven hundred and thirty-seven (737) acres. The outlet gate of said reservoir is located near the north end of said dam, the said gate being south, 73° 8′ E., 280 feet from the N. W. corner of the S. W. ¼ of said Section Six (6), in Township Ten (10) South, of Range Seventy (70) West.

4th. The line of said proposed tunnel, canal and pipe line will be as follows: From said outlet gate by tunnel South 79° 4′ E., 580 feet, more or less, to the bed of the South Fork of the South Platte River; thence down the South Fork of the South Platte River to the South Platte River; thence down the South Platte River, adopting the bed of said last mentioned streams as the canal or channel for conveying said waters to the headgate of the pipe line, located 257 feet South and 214 feet East of the N. W. corner of Section Four (4), Township Seven (7) South, Range Sixty-nine (69) West; thence through pipe line North, 57° 0′ E., 1,500 feet; thence on 30° curve to L., 95.3 feet; thence N., 28° 36′ E., 44.4 feet; thence on 18° curve to R., 130.6 feet; thence N., 51° 54′ E., 333 feet; thence on 28° curve to R., 192.3 feet thence on 24° curve to R., 155.2 feet; thence S., 39° 14′ E., 190.4 feet; thence on 16° curve to L., 107 feet; thence S., 56° 21′ E., 180.6 feet; thence on 22° curve to L., 165 feet; thence N., 87° 21′ E., 58.8 feet; thence on 40° curve to L., 92.9 feet; thence N., 50° 11′ E., 229.6 feet; thence on 20° curve to R., 136.7 feet; thence N., 77° 31′ E., 15.6 feet; thence on 20° curve to L., 115 feet; thence N., 54° 31′ E., 223.4 feet; thence on 14° curve to L., 160.7 feet; thence N., 32° 1′
1124 E., 330.5 feet; thence on 16° curve to R., 131.3 feet; thence N., 53° 0′ E., 547.1 feet; thence N., 38° 30′ E., 229 feet; thence S., 77° 45′ E., 84.4 feet; thence on 12° curve to L., 112.5 feet; thence N., 88° 50′ E., 3.9 feet; thence on 12° curve to R., 101.3 feet; thence S., 78° 55′ E., 77.7 feet; thence on 12° curve to R., 101.3 feet; thence N., 89° 5′ E., 29.5 feet; thence on 10° curve to L., 262.4 feet; thence N., 62° 51′ E., 320 feet; thence on 4°

curve to R., 200 feet; thence N., 70° 51′ E., 399 feet; thence on 10° curve to L., 200 feet; thence N., 50° 51′ E., 401 feet; thence N., 62° 51′ E., 448.4 feet; thence on 30° curve to L., 133.3 feet; thence N., 22° 51′ E., 196.7 feet; thence on 20° curve to R., 140 feet; thence N., 50° 51′ E., 231.6 feet; thence on 8° curve to R., 150 feet; thence N., 62° 51′ E., 722.8 feet; thence on 10° curve to L., 250 feet; thence N., 37° 51′ E., 324 feet; thence on 10° curve to L., 250 feet; thence N., 12° 51′ E., 644.2 feet; thence on 8° curve to R., 255 feet; thence N., 33° 15′ E., 1,012.4 feet; thence on 30° curve to L., 133.3 feet; thence N., 6° 45′ W., 685.7 feet; thence N., 9° 45′ E., 1,420 feet; thence N., 17° 45′ E., 1,184 feet; thence N., 10° 0′ E., 3,236 feet; thence N., 0° 50′ E., 1,760 feet; thence on 2° curve to L., 254.2 feet; thence N., 4° 30′ W., 4,680 feet; thence on 2° curve to R., 245.8 feet; thence N., 0° 25′ E., 469.7 feet; thence on 4° curve to R., 214.5 feet; thence N., 9° 0′ E., 1,671.3 feet; thence on 2° curve to L., 429.2 feet; thence North 3,101.5 feet parallel with and 20 feet West of the East line of Section Ten (10) Township Six (6) South, Range Sixty-nine (69) West; thence on 2° curve to R., 1,208.3 feet; thence N., 24° 10′ E., 10,385.7 feet; thence N., 8° 33′ E., 2,624 feet; thence N., 29° 27′ W., 2,845 feet; thence N., 1° 3′ E., 3,921 feet; thence on a 4° curve to R., 544.5 feet; thence N., 22° 50′ E., 1,505.2 feet; thence on 4° curve to R., 384.2 feet; thence N., 38° 13′ E., 2,004 feet to a point which is 1,191.5 feet North of the S. W. corner of Section Thirteen (13), Township Five (5) South, Range Sixty-nine (69) West; thence N., 38° 31′ E., 3,214 feet; thence N., 9° 29′ W., 400 feet to a point in Marston Lake, said point being 1,467 feet North and 781.2 feet West
1125 of the center of Section Thirteen (13), Township Five (5) South, Range Sixty-nine (69) West.

The dimensions of said pipe line, through which the said waters are to be conducted from the South Platte River at its headgate in Section 4, Twp. 7 S., Range 69 W., are sixty (60) inches in diameter, inside measurement, in that part of the pipe line which is made of wood, and seventy-eight (78) inches in diameter, inside measurement, in that part of the pipe line which is made of cement; the said pipe line to be partly of wood, bound by iron bands, and partly of cement. The descriptions and location of said reservoir, tunnel canal and pipe line, as herein given, are as accurate as can be given at the present time, and the right of said Company to deviate therefrom when it is impracticable or inexpedient to construct exactly according to said description and location is authorized and is reserved to said Company.

5th. The water flowing through said reservoir and tunnel and canal and pipe line is to be used for the purpose of irrigating lands, and for domestic, sanitary, mining, manufacturing and mechanical purposes, and for other uses set forth in paragraph 2 of this certificate of incorporation.

6th. The capital stock of this Company shall be Five Hundred Thousand Dollars ($500,000.00), divided into five thousand (5,000) shares of One Hundred Dollars ($100.00) for each share.

7th. The said Company shall exist for the term of twenty (20) years.

8th. The affairs of said Company shall be managed by seven directors, and Walter S. Cheesman, David H. Moffat, George W. Clayton, Thomas S. Hayden, Charles P. Allen, Erastus F. Hallack and Richard Holme shall be the directors for the first year and until their successors are elected and entered upon their duties.

9th. The principal office of said Company shall be in the city of Denver, in Araphoe County, Colorado.

10th. The business of said Company shall be carried on in the counties of Douglas, Jefferson, Arapahoe and Weld, in the state of Colorado.

1126 11th. The Directors of said Company are authorized to make such by-laws as they may deem necessary for the management of the affairs of the said corporation.

In testimony whereof, we, the above named incorporators, have set our hands and seals to this certificate of incorporation this Ninth day of January, 1894.

DAVID H. MOFFAT. [SEAL.]
WALTER S. CHEESMAN. [SEAL.]
THOMAS S. HAYDEN. [SEAL.]
CHARLES P. ALLEN. [SEAL.]
RICHARD HOLME. [SEAL.]

STATE OF COLORADO,
County of Arapahoe, ss:

I, Almon E. Hart, a Notary Public in and for said County in the State aforesaid, do hereby certify that Walter S. Cheesman, David H. Moffat, Thomas S. Hayden, Charles P. Allen and Richard Holme, who are personally known to me to be the persons whose names are subscribed to the foregoing certificate of incorporation, appeared before me this day in person, and duly acknowledged that they signed, sealed and delivered the said instrument in writing as their free and voluntary act, for the uses and purposes therein set forth.

Given under my hand and Notarial Seal this Ninth day of January, 1894.

(My commission expires Sept. 23rd, 1896.)

[Seal Almon E. Hart, Notary Public, Arapahoe Co., Colorado.]

ALMON E. HART,
Notary Public.

1127 Endorsed: 16443. Certificate of Incorporation of The South Platte Canal & Reservoir Company. Domestic. Filed in the office of the Secretary of State, of the State of Colorado on the 13 day of Jany. A. D. 1894 at 2:15 o'clock P. M. Recorded in Book 36 page 633. Nelson O. McClees, Secretary of State. By ——— ———, Deputy. 50.00.

1128 Examined and O. K. for Filing. Sims, Clerk.

Certificate of Extension and Renewal of Corporate Life of the South Platte Canal & Reservoir Company, for a Term of Twenty Years from the 13th Day of January, A. D. 1914.

We, John Evans and Walter P. Miller, respectively the President and Secretary of The South Platte Canal & Reservoir Company, a corporation duly organized under and by virtue of the laws of the state of Colorado, on the 13th day of January, A. D. 1894, do hereby certify that pursuant to the laws of the state of Colorado, in such case made and provided, and the unanimous action of the stockholders thereof, the term of the corporate life of said The South Platte Canal & Reservoir Company has been and hereby is continued, extended and renewed for a period of twenty (20) years from the 13th day of January, A. D. 1914, and that the minutes of the special meeting of the stockholders of said The South Platte Canal & Reservoir Company, held on the 21st day of March, A. D. 1914, inserted herein and made a part of this certificate, towit:

"Minutes of a special meeting of the Stockholders of The South Platte Canal & Reservoir Company, held at the offices of the Company, room 165 Shirley Annex in the city and county of Denver, State of Colorado, on Saturday, the 21st day of March, A. D. 1914, at the hour of two o'clock p. m.

"The meeting was called to order by Mr. John Evans, President of the Company, and L. M. Phebus was elected Secretary of the meeting.

"The following stockholders, owners respectively of the number of shares set opposite their names, were present, towit:

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In Person:	The Denver Union Water Company, by W. P. Robinson, President	4,993 shares.
	John Evans	1 share.
	W. P. Robinson	1 share.
	F. G. Moffat	1 share.
	D. C. Dodge	1 share.
	W. F. Hayden	1 share.
	Gerald Hughes	1 share.
By Proxy:	Walter P. Miller, proxy to John Q. Dier	1 share.
		5,000 shares.

"Total present in person and by proxy 5,000 shares, being all of the entire capital stock of said The South Platte Canal & Reservoir Company.

"The President read the call for the meeting, signed by the owners and holders of more than ten per cent of the entire capital stock of the Company, towit: By the owners and holders of all of the entire capital stock, and the proof of publication of the same,

which had theretofore been duly published for four consecutive weeks in a newspaper printed nearest the place where said The South Platte Canal & Reservoir Company has kept its principal office; also copy of the notice mailed to each of the stockholders of the Company more than thirty days prior to the date fixed for this meeting, and the proof or affidavit of such mailing, each thereof respectively being in words and figures as follows, towit:

"Call of Meeting.

"'We, the undersigned, owners of the numbers of shares set opposite our names and being more than ten per cent, towit, all of the capital stock of The South Platte Canal and Reservoir Company, and as such owners, do hereby call a special meeting of the stockholders of said Company to consider and vote on the question of extending the term of the corporate existence of said corporation for another term of twenty years, pursuant to the statutes of the State of Colorado in such case made and provided, said meet-
1130 ing to be held in Room 165 of the Shirley Annex, Seventeenth and Broadway Streets, City and County of Denver, State of Colorado, on Saturday, the 21st day of March, A. D. 1914, at the hour of 2 o'clock p. m.

The Denver Union Water Company, by W. P. Robinson, President	Owner of	4,993 shares.
D. C. Dodge	Owner of	1 share.
John Evans	Owner of	1 share.
F. G. Moffat	Owner of	1 share.
Wm. F. Hayden	Owner of	1 share.
W. P. Miller	Owner of	1 share.
W. P. Robinson	Owner of	1 share.
Gerald Hughes	Owner of	1 share.

"'*Affidavit of Publication.*

"'STATE OF COLORADO,
City and County of Denver, ss:

"'I, Herbert Fairall, of said City and County of Denver, State of Colorado, being duly sworn, upon oath, say and certify that I am the publisher of The Daily Journal; that said The Daily Journal is a public newspaper published in said City and County of Denver; that said The Daily Journal is published every day excepting Sundays and legal holidays; that said The Daily Journal is a daily newspaper within the meaning of the act of the General Assembly of the State of Colorado, approved April 21, 1897, and entitled "An Act to Regulate the Printing of Legal Notices and advertisements;" that said The Daily Journal is also a daily newspaper within the meaning of the act of the General Assembly of the State of Colorado, approved April 9th, 1907, and entitled "An Act Defining a Daily Newspaper" and as amended by an act approved April 19, 1909, and entitled "An Act to Amend Section One (1) of an Act entitled 'An Act De-

fining a Daily Newspaper,' Chapter 199 Laws of 1907;" that said newspaper is printed in whole and published in said City and
1131 County of Denver and has a general circulation therein; that said newspaper had been established and continuously and uninterruptedly so printed and published as a public daily newspaper in said City and County of Denver for more than six consecutive months immediately prior to the first publication of the annexed notice; that said notice was published every day in the regular and entire issue of every number of said newspaper for a period of thirty-one consecutive days; and that the first publication of said notice was in the issue of said newspaper bearing date the 11th day of February, A. D. 1914, and the last publication of said notice was in the issue of said newspaper bearing date the 13th day of March, A. D. 1914.

HERBERT FAIRALL.

" 'Subscribed and sworn to before me this 13th day of March, A. D. 1914.

" 'My commission expires March 2, 1915.

[NOTARIAL SEAL.] ROBERT H. LATTA,
Notary Public.'

" 'Stockholders Meeting.

" 'We, the undersigned, owners of the number of shares set opposite our names and being more than ten per cent, towit, all of the capital stock of The South Platte Canal and Reservoir Company, and as such owners, do hereby call a special meeting of the stockholders of said Company to consider and vote on the question of extending the term of the corporate existence of said corporation for another term of twenty years, pursuant to the statutes of the State of Colorado in such case made and provided, said meeting to be held in Room 165 of the Shirley Annex, Seventeenth and Broadway Streets, City and County of Denver, State of Colorado, on Saturday the 21st day of March, A. D. 1914, at the hour of 2 o'clock p. m.

The Denver Union Water Company, by W. P. Robinson, President	Owner of	4,993	shares.
D. C. Dodge	Owner of	1	share.
John Evans	Owner of	1	share.
1132 F. G. Moffat	Owner of	1	share.
Wm. F. Hayden	Owner of	1	share.
W. P. Miller	Owner of	1	share.
W. P. Robinson	Owner of	1	share.
Gerald Hughes	Owner of	1	share.

First publication, February 11, 1914.
Last publication, March 13, 1914.'

"'*Copy of Notice Sent to Stockholders.*

'DENVER, COLO., Feb. 11, 1914.

Stockholders' Meeting.

"'We, the undersigned, owners of the number of shares set opposite our names and being more than ten per cent, towit, all, of the capital stock of The South Platte Canal & Reservoir Company, and as such owners, do hereby call a special meeting of the stockholders of said Company to consider and vote on the question of extending the term of corporate existence of said corporation for another term of twenty years, pursuant to the statutes of the State of Colorado in such case made and provided, said meeting to be held in Room 165 of the Shirley Annex, Seventeenth and Broadway Streets, City and County of Denver, State of Colorado, on Saturday the 21st day of March, A. D. 1914, at the hour of 2 o'clock p. m.

The Denver Union Water Company, by W. P. Robinson, President	Owner of	4,993 shares.
D. C. Dodge	Owner of	1 share.
John Evans	Owner of	1 share.
F. G. Moffat	Owner of	1 share.
Wm. F. Hayden	Owner of	1 share.
W. P. Miller	Owner of	1 share.
W. P. Robinson	Owner of	1 share.
Gerald Hughes	Owner of	1 share.

"'*Copy of Affidavit of Mailing Notices.*

"STATE OF COLORADO,
City and County of Denver, ss:

1133 "'I, Lulu M. Phebus, of lawful age, being first duly sworn, on oath, say:

"'That on February 11th, A. D. 1914, and more than thirty (30) days before the special meeting of the stockholders of The South Platte Canal and Reservoir Company to be held on the 21st day of March, A. D. 1914, I deposited in the post office at Denver, Colorado, a notice of which the following is a true copy, addressed to each of the stockholders of said The South Platte Canal and Reservoir Company, at its or his last known post office address, and that the postage on said notice was fully pre-paid.

"Stockholders' Meeting.

"'We, the undersigned, owners of the number of shares set opposite our names and being more than ten per cent, towit, all, of the capital stock of The South Platte Canal and Reservoir Company, and as such owners, do hereby call a special meeting of the stock-

holders of said Company to consider and vote on the question of extending the term of corporate existence of said corporation for another term of twenty years, pursuant to the statute of the state of Colorado in such case made and provided, said meeting to be held in Room 165 of the Shirley Annex, Seventeenth and Broadway Streets, City and County of Denver, State of Colorado, on Saturday the 21st day of March, A. D. 1914, at the hour of 2 o'clock p. m.

The Denver Union Water Company, by W. P. Robinson, President	Owner of	4,993 shares.
D. C. Dodge	Owner of	1 share.
John Evans	Owner of	1 share.
F. G. Moffat	Owner of	1 share.
Wm. F. Hayden	Owner of	1 share.
W. P. Miller	Owner of	1 share.
W. P. Robinson	Owner of	1 share.
Gerald Hughes	Owner of	1 share.

LULU M. PHEBUS.

" 'Subscribed and sworn to before me this 13th day of February, A. D. 1914.

1134 " 'My commission will expire March 3, 1915.

GEORGE W. SKOULAND,

[NOTARIAL SEAL.] *Notary Public.*

"The following resolution was thereupon offered by Mr. Hayden, and is in words and figures as follows, towit:

" 'Whereas, the corporate life fixed in the charter heretofore granted to The South Platte Canal and Reservoir Company by the state of Colorado, did expire on or about the 13th day of January, A. D. 1914, and under and by virtue of the laws of the said State and by complying with certain requirements of the laws of the State of Colorado in reference thereto, an extension or renewal of said charter for a period of twenty years may be secured;

" 'Now, therefore, be it resolved that the charter of this Company be extended in accordance with the statutes of the state of Colorado in such case made and provided, and that the President and Secretary of The South Platte Canal and Reservoir Company be and they are hereby authorized and empowered to do any and all things required by the statutes of the state of Colorado to secure an extension or renewal of the charter of The South Platte Canal and Reservoir Company for a period of twenty years from and after the date of the expiration of said charter, as aforesaid, including the signing and filing of such certificates and the payment of such fees as may be necessary to carry into effect the purpose of this resolution.'

"Thereupon, it was moved and seconded that said resolution be adopted, and on ballot being taken thereon the said resolution was adopted by a vote of 5,000 shares, said shares being more than a majority, towit, all, of the entire capital stock of The South Platte Canal and Reservoir Company. That the stockholders voting by

ballot for said resolution and owners of and representing the number of shares set opposite their respective names are as follows, towit:

In Person:	The Denver Union Water Company, By W. P. Robinson, President	Owner of	4,993 shares.
1135	D. C. Dodge	Owner of	1 share.
	John Evans	Owner of	1 share.
	F. G. Moffat	Owner of	1 share.
	Wm. F. Hayden	Owner of	1 share.
	W. P. Robinson	Owner of	1 share.
	Gerald Hughes	Owner of	1 share.
By Proxy:	W. P. Miller, Proxy to J. Q. Dier	Owner of	1 share.

Makin a total of 5,000 shares present in person and by proxy, voting in favor of said resolution.

"There being no further business the meeting, on motion duly seconded, adjourned.

JOHN EVANS, *President.*

(Signed)

(Signed) L. M. PHEBUS,
Secretary of the Meeting."

Are a true and correct copy of the minutes of a special meeting of the stockholders of The South Platte Canal & Reservoir Company, duly called for and held, in compliance with the statutes of the State of Colorado in reference thereto, on Saturday, the 21st day of March, A. D. 1914, at the hour of two o'clock p. m. on said day.

In witness whereof we have hereunto set our hands and seals this 10th day of April, A. D. 1914, and attached the corporate seal of this Company.

JOHN EVANS,
President of The South Platte Canal & Reservoir Company.

[COPORATE SEAL.]

WALTER P. MILLER,
Secretary of The South Platte Canal & Reservoir Company.

1136 STATE OF COLORADO,
City and County of Denver, ss:

I, Walter E. Wilmot, a notary public in and for said City and County in the State aforesaid, do hereby certify that John Evans and Walter P. Miller, who are each personally well known to me and known to me to be respectively the President and Secretary of The South Platte Canal & Reservoir Company, appeared before me this day in person and acknowledged that they executed the foregoing instrument in writing in their respective capacities of President and Secretary of said The South Platte Canal & Reservoir Company, as the free and voluntary act of the said Company and as their own free

and voluntary act for the uses and purposes therein set forth; and the said John Evans and Walter P. Miller, being each by me duly sworn, do depose and say each for himself that the seal affixed to the foregoing instrument is the corporate seal of said The South Platte Canal & Reservoir Company, that said seal was affixed thereto and said instrument signed by them respectively as President and Secretary of said Company, as authorized and empowered by the resolution of the stockholders of said Company adopted on the 21st day of January, A. D. 1914, as in said foregoing certificate set forth, and that the statements contained in the foregoing certificate are true.

In Witness Whereof I have hereunto set my hand and set my official seal this 18th day of April, 1914.

My commission as a notary public will expire October 31, 1914.

[NOTARIAL SEAL.] WALTER E. WILMOT,
Notary Public.

1137 Endorsed: Renewal. 59528. Certificate of Amendment to the Certificate of Incorporation of The South Platte Canal and Reservoir Company. Extension of Corporate Existence. Domestic. Received payment Apr. 20, 1914. James B. Pearce, Sec'y of State, by Carl Albin, Cashier. Filed in the office of the Secretary of State of the State of Colorado, on 1914 Apr. 20, A. M. 9.59. Recorded in Book 165, page 544. James B. Pearce, Sec'y of State, By Thos. F. Dillon, Jr., Deputy. Fees $110.00, Clerk Miles. 4-88-25. This document has been Inspected and property Entered on the Records of the Flat Tax Department. Date Apr. 20, 1914. Somers, Clerk. Recorded by Fowler, Date 5/6/14. Compared by Fowler & McElroy. Indexed by C. I. P.

1138 [Endorsed:] 6274. U. S. District Court, District of Colorado. Plaintiff's Exhibit E. Filed Oct. 6, 1915, Charles W. Bishop, Clerk.

1139 Case No. —.

COMPLAINANT'S EXHIBIT NO. Q.

STATE OF COLORADO,
County of Park, ss:

In the District Court of the Eleventh Judicial District of the State of Colorado, Sitting Within and for the County of Park.

Pleas in the district court of the eleventh judicial district of the state of Colorado, sitting within and for the county of Park, before the Honorable Charles Cavender, Judge of the fifth judicial district of the state of Colorado, sitting for and at the request and in the place of the Honorable Charles A. Wilkins, Judge of the eleventh judicial district of the state of Colorado, at a term thereof begun and held at the court house in the town of Fairplay, in said county, on the third Monday (it being the 19th day) of May, A. D. 1913.

Present:

Honorable Charles A. Wilkin, Judge of the District Court of the Eleventh Judicial District.

Honorable Charles Cavender, Judge of the District Court of the Fifth Judicial District and sitting as a Judge of the District Court of the Eleventh Judicial District.

Gilbert A. Walker, Esq., District Attorney of said District.

O. P. Speerlock, Esq., Sheriff of said County.

A. F. Willmarth, Esq., Clerk of said court.

Be it remembered, that heretofore and on, towit, the 22nd day of May, A. D. 1913, the same being one of the regular judicial days of the May A. D. 1913 Term of said Court, the following proceedings, inter alia, were had and entered of record in said court, towit:

1140 STATE OF COLORADO,
County of Park, ss:

In the District Court of the Eleventh Judicial District of the State of Colorado, Sitting Within and for the County of Park.

No. 1636.

In the Matter of PRIORITIES OF WATER RIGHTS IN WATER DISTRICT No. 23, IN THE STATE OF COLORADO.

On Petition of the South Platte Canal and Reservoir Company for the Adjudication of Water Rights of Lake Cheesman, for Beneficial Purposes other than Irrigation.

Decree.

Now on this 22nd day of May, A. D. 1913, this matter coming on before the court for final hearing and adjudication, upon the report of C. P. Gehman, Referee appointed herein, and to whom this matter was by order of this court, entered on the 22nd day of May, 1912, referred for the purposes and as in said order mentioned, and upon the several findings of the Referee, and upon the evidence taken herin; and the court being now fully advised in the premises,

Doth Find and Adjudge from the several notices, certificates of publication, affidavits and certificates and report of said Referee, that all the said testimony taken herein and returned by said Referee, and upon which the findings of said Referee have severally been made, was taken upon due and lawful notice, and in all respects according to the statute in such case made and provided, and the rules and several orders of this court in that behalf made and entered of record herein; and further, that all interested in this matter and entitled to notice in any stage of the proceedings herein have at all times been duly notified according to law and the orders of this court, and the report of said Referee, together with the returns of service of notices, affidavits, certificates, lists, exhibits, abstracts, testi-

mony, findings and draft of decree, are in due form, and the
1141 court having heard all parties, and their attorneys, so far as they may have desired to be heard, respectively, touching the several matters herein.

It is by the court, in consideration of all the premises, hereby Ordered, Adjudged and Decreed, that the several findings of said Referee, as reported to and filed in this Court, be in all things approved and confirmed, and that they be taken, deemed and held in all respects as the findings of the Court in this matter; and it is further, upon like consideration, by this Court,

Ordered, Adjudged and Decreed, in respect to all and singular the ditches, canals, pipe lines and reservoirs constructed and used for beneficial purposes other than irrigation, in and for said Water District No. 23, that:

1. Saving as decreeing the rights and priorities of appropriations of water to the claimants thereof, no part of this decree shall in any case be taken, deemed or held to confirm, impair, or in any manner affect any claim of right or property held or claimed by any person, association or corporation, in or to any canal, ditch, pipe line or reservoir, or any part thereof, or to the land or any part thereof, on which any of the same may be located or situated, or the land held or claimed for right of way of any of them, or any right, interest or claim of property whatever in or relating to any of them.

2. No part of this decree shall be taken, deemed or held as determining the rights of any consumer, renter, or lessee of water, or as affecting in any manner any question or claim of right between the owners or claimants of any ditch, canal, pipe-line or reservoir, as between each other, whether as part owners or shareholders therein, or as stockholders in any corporation or joint stock company claiming or to claim the same or any part thereof, nor shall it affect the rights, interests or claims of any consumer of water, whether as part owner, lessee, shareholder or stockholder in any corporation owning or controlling the same, or as purchaser of water therefrom, as against the rights, interests or claims of any other party or parties interested or claiming interest or right in or to such ditch, canal, pipe line, or reservoir, as owner, lessee, or part owner thereof,
1142 or as shareholders or stockholders in any corporation claiming the same, or as purchasers of water therefrom neither shall it affect any claim of seniority and priority made or resisted as between parties using water for said purposes from the same ditch, canal, pipe line or reservoir as to such water.

3. Saving as decreeing the rights and priorities of appropriations of water to the claimants thereof, this decree shall not affect in any manner, any claim, interest, or right of any corporation as to the right of property in any ditch, canal, pipe line or reservoir, or the ground on which the same may be located or situated, or any question which may arise between the stockholders thereof, or between them and any party or parties, upon the dissolution of such corporation by expiration of its charter or otherwise, as to any appropriation of water, or rights secured by condemnation proceedings by such corporation during its legal existence.

4. No part of this decree shall affect in any manner any right, claim or interest now or hereafter held or claimed to any appropriation of water made after the closing of testimony herein touching the construction or enlargement of the ditch, canal, pipe line or reservoir by means of which said appropriation may have been made.

5. No part of this decree shall be taken or held as adjudging to any claimant, or present or future representatives, of any claim to any ditch, canal, pipe line or reservoir, or party holding, using or controlling the same, any right to take and carry by means of any canal, ditch, pipe line or reservoir herein mentioned, or by virtue of any appropriation herein adjudged, any water from any natural stream, water course or any other source, except to be applied to the beneficial use for which such appropriation was made, nor to allow any excessive use or waste of water whatever, nor to allow any diversion of water, except for lawful and benficial purposes; that in all
1143 cases of non-consumptive beneficial use the water so beneficially used shall be immediately returned to the stream or other natural source whence it is taken, or the stream or streams into which such stream or other natural source may run or be tributary, within the nearest practical distance from the point of user, without diminution in quantity or contamination or injury in quality; in no instance shall water be permitted to run through any ditch, canal or pipe line, or into any reservoir, except for the purpose of beneficial use, nor in any greater quantity than actually required for the particular beneficial use herein decreed.

6. This decree shall be taken, deemed and held as determining and establishing the several priorities of right by appropriation to the use of water from the natural streams, water courses and other natural sources of water in said Water District No. 23 for all beneficial uses and purposes other than irrigation, of the several ditches, canals, pipe lines and reservoirs in said water district, concerning which testimony has been offered in this matter, according to the construction, enlargement, extension or use, thereof, with the amount of water held herein to have been appropriated thereby. And it is ordered, adjudged and decreed that the claimants hereinafter named respectively, or others lawfully entitled thereto under and by virtue of the several approriations of water hereinafter stated to be established or decreed be and they are hereby authorized and permitted to take, divert, impound or otherwise use water as it is hereinafter determined and established to be the right of such claimants or others so to do.

7. Whenever the dimensions of any ditch or of any feeder to a reservoir are found, or the height to which any reservoir may be filled is stated in this decree, such dimensions shall be deemed and taken to control the statement of the estimated carrying capacity thereof, and such height shall be deemed and taken to control the statement of the estimated storage capacity of any such reservoir.

Subject to the foregoing seven provisions, it is further, as to said ditches, canals, pipe lines and reservoirs, and to the several
1144 appropriations of water by means of them, respectively, claimed in this matter, Ordered, Adjudged and Decreed that

said ditches, canals and pipe lines, and said reservoirs be, and the same are, hereby separately numbered consecutively and chronologically according to the dates of their several and respective constructions, and said numbers and said dates are hereby determined and decreed to be as follows, that is to say:

* * * * * * *

And as to reservoirs for beneficial uses other than irrigation:

No.	Name of Reservoir.	Date.
3	Lake Cheesman.	June 27, 1889.

* * * * * * *

And the several appropriations of water for said reservoirs, respectively, as acquired by their respective construction, extensions and enlargements, are hereby numbered and declared, with the dates of said appropriations, to be as follows:

As to reservoirs, for beneficial uses other than irrigation:

Priority No.	Name of Reservoir.	Date.
3	Lake Cheesman, by original construction.	June 27, 1889.
7	Lake Cheesman, by first enlargement.	Sept. 24,1893.

* * * * * * *

And said ditches, canals and pipe lines and reservoirs, respectively, are entitled to said appropriations, and priorities on the aforesaid numbers, and in the amount of water according to their respective appropriations and priorities as follows, towit:

* * * * * * *

And as to reservoirs for beneficial uses other than irrigation:

1145

Reservoir No.	Name of reservoir,	Priority No.	Cubic feet.
3	Lake Cheesman.	3	1,336,898,400.
	Lake Cheesman.	7	2,107,140,012.

* * * * * * *

And more particularly in respect to said ditches, canals, pipe lines and reservoirs, respectively, and the enlargements thereof, respectively, it is Found, Ordered, Adjudged and Decreed, as follows, towit:

* * * * * * *

Reservoir No. 3.

Lake Cheesman.

The Court finds: That said Lake Cheesman reservoir is owned by the South Platte Canal and Reservoir Company, which is a corporation duly organized and existing under and by virtue of the laws of the state of Colorado; that valid appropriations of water for storage purposes and other beneficial uses have been made by said The South Platte Canal and Reservoir Company, and its predecessors in title, for and by means of said Lake Cheesman, and that said The South Platte Canal and Reservoir Company is entitled, by reason of said appropriations, to have the water rights of said Lake Cheesman in the amounts, of the dates and to the extent hereinafter set forth, numbered as follows, towit: Priority No. 3, by construction, and Priority No. 7, by enlargement; that said reservoir and the water and storage rights thereunto appertaining are leased by said The South Platte Canal and Reservoir Company to The Denver Union Water Company; that said The Denver Union Water Company has at all times since its organization in 1894, and is now, affording to the city of Denver, and its inhabitants their sole protection against fire and drouth, and with its predecessors has been engaged since the year 1872 in supplying and furnishing to the city of Denver and its inhabitants, and to towns and people living along the lines of its conduits, water for all municipal uses,
including fire protection, street sprinkling, street washing,
1146 sewer flushing, park, lawn and garden watering, public
fountains, and other public and sanitary purposes, and manufacturing, domestic, mechanical and other beneficial uses and purposes, said city of Denver and its inhabitants being chiefly dependent upon said The Denver Union Water Company for their water supply; that said The South Platte Canal and Reservoir Company is an auxiliary or subsidiary company of said The Denver Union Water Company; that said reservoir constitutes the chief storage or impounding source of water supply of said The Denver Union Water Company for the beneficial uses and purposes aforesaid; that said reservoir is located on the south fork of the South Platte river, in Jefferson and Douglas counties, Colorado, in Water District No. 23, upon land owned in fee by The South Platte Canal and Reservoir Company; that said land upon which said reservoir is located, together with the land immediately adjacent thereto, acquired and owned by claimant for the purpose of protecting and maintaining the purity of the water stored and impounded in said Lake Cheesman, consists in area of 8436.1 acres and is described as follows, towit: All of sections 1, 2, 11, 12, 13, 14, 23, and 24, in township 10 south, range 71 west, all of sections 6, 7, 18 and 19, in township 10 south, range 70 west, all of section 36 in township 9 south, range 71 west, and the southeast quarter of section 35 in township 9 south, range 71 west of the Sixth Principal Meridian; and that said reservoir covers an arear of 874.08 acres in sections 35 and 36, township

9 south, range 71 west, sections 6 and 7, township 10 south, range 70 west, and sections 1, 2, 12, 13, 14, 23 and 24, township 10 south, range 71 west; that said Lake Cheesman is supplied with water from the flow in Lost Park or Goose Creek, and Turkey Creek and their tributaries, and the South Fork of the South Platte river, and all of its tributaries above said reservoir; that the dam of said reservoir is located in the northwest quarter of the southwest quarter of section 6, township 10 south, range 70 west, in the channel of the south fork of the South Platte river, near its junction with Lost Park or Goose Creek; that the center of the top of the north end of said dam is from the northwest corner of said section 6 south 14 degrees 11 minutes 4 seconds east 2818.4 feet; that the length
1147 of said dam from said north end along the center line of the the top thereof is 700 feet to the southerly end thereof, the center line of the top of said dam being on the arc of a circle whose radius is 390.89 feet, that the center of said arc is south 56 degrees 50 minutes 17 seconds east 390.89 feet, from the center of the top of the north end of said dam as given; that the length of said dam on top is 700 feet, that the height thereof is 217 feet above datum, that the level of the spillway is 212 feet above datum, and thence 5 feet to the crest of the dam; that the spillway is located on a spur of the mountain about 200 feet north of the north end of said dam; that the length of the spillway is 300 feet at the elevation of 212 feet, and 400 feet at the elevation of 217 feet; that the datum plane for elevation was the low water mark of the south fork of the South Platte river at the dam site before construction, and is 6644 feet above sea level and 250.849 feet below the top of a bolt in the township corner at the northwest corner of section 6, township 10 south, range 70 west; that the area of the catchment basin or watershed of said Lake Cheesman is 1796 square miles; that the capacity of said reservoir at the high water level, towit, 212 feet, is three billion, four hundred and forty-four million, thirty-eight thousand, four hundred twelve cubic feet (3,444,038,412 cu. ft.) of water; that the inlet to the lowest outlet tunnel leading from said reservoir is 15 feet above the datum line of contour of reservoir and is near the north end of said dam, being south 7 degrees 26 minutes 30 seconds east 2937.6 feet from the northwest corner of section 6, township 10 south, range 70 west; said tunnel running thence south 70 degrees 17 minutes east 455 feet through a spur of the mountain, and is 6 feet wide and 7 feet high for 290 feet and is 7 feet wide and 9 feet high for the remaining 165 feet, with two valves therein side by side, each being 42 inches in diameter; that the middle outlet tunnel of said reservoir is 5½ feet wide by 6½ feet high, with a 42-inch valve therein, and the upper outlet tunnel of said reservoir is 5 feet wide by 6 feet high, with a 42-inch valve therein, and said
middle and upper tunnels are respectively 60.5 and 104.7
1148 feet above said datum perpendicularly over said lowest tunnel, and by an incline tunnel empty into the last 165 feet of said lowest tunnel; that water can be drawn off to within 15 feet of the datum or base of said Lake Cheesman; from the lower end of said tunnel, the water stored and impounded in said Lake Cheesman

now empties into the bed of the south fork of the South Platte river and thence is taken along and in the same and in the bed of the South Platte river to the headgates and intakes of the pipe lines, flumes, ditches, settling basins, auxiliary reservoirs, filter beds and water works belonging to claimant and The Denver Union Water Company at or near the mouth of Platte Canon, in section 5, township 7 south, range 69 west, and in sections 33, 34 and 35, in township 6 south, range 69 west, in Douglas and Jefferson counties, Colorado, and to such other ditches, flumes and conduit lines as claimant or said The Denver Union Water Company may desire to furnish water.

The Court further finds: That the Citizens Water Company, one of the predecessors of said The Denver Union Water Company and a corporation duly organized under the laws of the state of Colorado for the purpose of engaging in the business of supplying the city of Denver and the inhabitants thereof with water for the municipal, domestic, manufacturing, mechanical and other beneficial uses and purposes aforesaid, on the 27th day of June, A. D. 1889, commenced the construction of a certain storage or impounding reservoir known as the Strong reservoir for the purpose of augmenting its supply of water for the uses and purposes aforesaid; that on the 28th day of December, 1889, said The Citizens Water Company duly made and filed in the office of the state engineer of Colorado its statement of claim of an appropriation for storage purposes of the unappropriated waters of the South Platte river and its tributaries above the headgates of the diverting conduits of said Strong reservoir for the full capacity of said Strong reservoir at high water mark, towit, one billion, three hundred thirty-six million, eight hundred ninety-eight thousand, four hundred cubic feet (1,336,-
1149 898,400); that said Strong reservoir was located near the mouth of said Platte canon in Jefferson county, Colorado, upon land owned in fee by said The Citizens Water Company, in sections 16, 17 and 21, in township 6 south, range 69 west of the 6th Principal Meridian, and the surface area of said reservoir at high water mark was 396.61 acres.

That said reservoir was planned to be formed by the construction of an inner and an outer earthen dam; that the length of the inner dam was 600 feet; width of inner dam at bottom was 986 feet; height of inner dam to crest thereof, 245 feet; that the height of the outer dam was 320 feet; that the length of the feeder conduits was 18 miles; that said conduits as planned consisted of wooden pipe lines 48 inches in diameter; that water could be stored in said reservoir to a depth of 245 feet; that the capacity of said Strong reservoir at high water level was one billion, three hundred thirty-six million, eight hundred ninety-eight thousand, four hundred cubic feet (1,-336,898,400) of water;

That the source of the water supply of said Strong reservoir was the said South Platte river, a natural stream, by means of diverting conduits and pipe lines; that a duly certified copy of said statement of claim for and map of said Strong reservoir and feeder pipe lines so filed as aforesaid in the office of the Colorado State Engineer

on the 28th day of December, 1889, has been offered and received in evidence herein;

That the construction of said reservoir was a large and hazardous undertaking, involving many engineering difficulties and risks on account of its being solely an earthen dam, and necessitating large expenditures of money, and extensive preliminary work;

The Court finds, from all the evidence concerning the conditions surrounding the construction of said Strong reservoir; That the construction of said Strong reservoir was actively carried on by said The Citizens Water Company and prosecuted with due diligence from said 27th day of June, 1889, until the 24th day of September, 1893, said The Citizens Water Company expending in said work
1150 of construction about the sum of $70,000; that after the work of the construction of said Strong reservoir had progressed as aforesaid and the sums of money aforesaid had been expended therein, James D. Schuyler, the consulting engineer of said The Citizens Water Company, recommended and advised on account of the height of the proposed earthen dams of said reservoir, the liability and danger of said earthen dams breaking when the reservoir was filled and the uneasiness and anxiety which would be felt in that regard, that said The Citizens Water Company find and obtain a better and safer reservoir site in the mountains and transfer its water rights and claims thereto; that accordingly, and pursuant to said recommendations and advice, on said 24th day of September, 1893, a surveying party under the charge of the chief engineer of said The Citizens Water Company discovered the reservoir site of said Lake Cheesman; that thereupon all construction work upon said Strong reservoir was suspended and shortly thereafter the claimant company, The South Platte Canal and Reservoir Company, was organized by the parties owning and controlling said The Citizens Water Company and all rights to the use of water and appropriations for storage and other beneficial uses and purposes from said South Platte river for and on account of said Strong reservoir and for and on account of said Lake Cheesman reservoir were transferred, assigned and set over by said The Citizens Water Company to said The South Platte Canal and Reservoir Company, claimant herein, which Company thereafter continued the work of the construction of said Lake Cheesman; that on the 19th day of January, 1894, said The South Platte Canal and Reservoir Company duly made and filed in the office of the state engineer of Colorado, its map and statement of claim of its appropriations for storage purposes for and by means of said Lake Cheesman of all the unappropriated waters of the south fork of the South Platte river, of Lost Park or Goose creek, and Turkey creek and their tributaries, above the point where the dam of said reservoir was then proposed to be and is now constructed, said waters to be used, as set forth in said statement of claim, "for irrigating, domestic, sanitary,
1151 mining, manufacturing and mechanical purposes, and to supply and sell to irrigating companies and water works companies for the purposes aforesaid," and further claiming "the right to use said reservoir for any other purposes for which it may be

utilized, not inconsistent with the main purposes"; that in and by its said map and statement of claim said The South Platte Canal and Reservoir Company also claimed for said Lake Cheesman the appropriation and date of priority of said The Citizens Water Company made for said Strong reservoir; that a duly certified copy of said map and statement of claim thus filed in said State Engineer's office has been offered and received in evidence herein:

The Court further finds; that the work of construction of said Lake Cheesman was commenced by said The Citizens Water Company by original survey on, towit, the 24th day of September, A. D. 1893, being the date found by the court to be the date when construction work was actually commenced on said Lake Cheesman; that the construction of the dam of said Lake Cheesman and the clearing of the reservoir site of trees, brush and debris was a very large and expensive undertaking, involving many engineering difficulties, owing to the remote location of said reservoir site in the mountains, far removed from any railroads, and the rugged and mountainous character of the surrounding country; that said The Citizens Water Company and its successor, the said The South Platte Canal and Reservoir Company, the claimant herein, carried on the work of construction of said Lake Cheesman reservoir and the building of the dam and prosecuted the same with due diligence until its completion; that a rock fill dam was first constructed and was well under way when it was washed out by unprecedented high water on the 3rd of May, 1900; that immediately thereafter the present masonry dam was begun and was completed in the fall of the year 1904; that the storing and impounding of water in said Lake Cheesman began in the year 1900 and continued as the work of constructing said masonry dam progressed; that the waters stored in said Lake Cheesman have been put to a beneficial use by the claimant and said The Denver Union Water Company in supplying the city of Denver and its inhabitants with water for all the
1152 municipal, domestic, manufacturing, mechanical and other beneficial uses and purposes aforesaid, and in affording fire protection and protection against drouth to said city and its inhabitants, since the year 1900 as aforesaid, and from that time continuously; that on the 7th day of July, 1904, said The South Platte Canal and Reservoir Company, pursuant to the provisions of an Act of the General Assembly of the state of Colorado, entitled "An act concerning water rights," approved April 11, 1903, duly made and filed in the office of the state engineer of Colorado its map and statement of claim of its appropriations for storage purposes for and by means of said Lake Cheesman, and in said map and statement made its claim of its appropriations as follows, towit: "The South Platte Canal and Reservoir Company appropriates and claims the right to store in said reservoir all of the unappropriated and flood waters, and waters flowing in the non-irrigating season, in Lost Park or Goose Creek and in Turkey creek and their tributaries, and in the south fork of the South Platte river and in all its tributaries above said reservoir, as of the date of October 23, 1893, and also as of the date of the filing of The Citizens Water Company, towit: De-

cember 28th, 1889, on a reservoir intended to store the same waters for the same use, to whose rights claimant has succeeded, and also claims the right to use such stored water for domestic purposes in the city of Denver and along the lines of its mains and the mains of The Denver Union Water Company, and for irrigating, sanitary, mining, manufacturing, mechanical, fire, power and storage purposes, and for all other beneficial purposes, and the right to supply and sell such waters for the purposes aforesaid;" that a duly certified copy of said map and statement of claim thus filed in said state engineer's office has been offered and received in evidence herein; that said Lake Cheesman was filled to its full capacity, towit: 3,444,038,412 cubic feet, for the first time on the 9th day of May, A. D. 1905;

The court further finds from the evidence; that on the 17th day of March, 1912, there was stored and impounded in said Lake
1153 Cheesman, 2,205,780,749 cubic feet of water, and that on said date The Denver Union Water Company had impounded or in storage in said Lake Cheesman and the only other storage reservoir owned by said company a supply of water only equal to the demands and necessities of the city of Denver and its inhabitants for one year.

The Court further finds: That all of the storage rights and capacity of Lake Cheesman is needed by the claimant and The Denver Union Water Company for the municipal, domestic, manufacturing, mechanical and other beneficial uses and purposes aforesaid, and that all the waters therein stored and impounded have been applied to said beneficial uses and purposes;

The Court further finds: That the said city of Denver and the inhabitants thereof, and outlying towns and people living along the lines of the conduits of The Denver Union Water Company, are dependent upon said The Denver Union Water Company and said The South Platte Canal and Reservoir Company for water for protection against fire and drouth, and for the municipal, domestic, manufacturing, mechanical and other beneficial uses and purposes aforesaid, and that the present provisions for storing and holding in reserve of water at Lake Cheesman to meet these demands and necessities are required, and that anything less than the present supply and storage capacity and water held in reserve would be inadequate for the uses and purposes aforesaid in the climatic conditions prevailing in the state of Colorado.

The Court further finds that said Strong reservoir was intended by said The Citizens Water Company, to whose rights claimant herein has succeeded, for the impounding and storage of the same waters and for the same uses which are impounded and stored for the uses aforesaid in Lake Cheesman.

It is therefore, ordered, adjudged and decreed: That claimant, its successors and assigns, and the lawful owners of said Lake Cheesman, have appropriated for storage purposes and have a priority of appropriation to take effect on the 27th day of June, A. D. 1889, and be allowed to take, divert, store and impound from the other-
1154 wise unappropriated waters flowing in said Lost Park or Goose creek and in Turkey creek and their tributaries, and

in the South Fork of the South Platte river, and in all its tributaries, above the dam of said Lake Cheesman, and flood waters and waters flowing in the non-irrigating season, and at all times by replenishing to maintain so far as such otherwise unappropriated waters aforesaid are sufficient and will permit, as of said date, the same being the date of the commencement of the work of the construction of said Strong reservoir, which date is hereby by relation made and is to be deemed, taken and considered as the date of the appropriation by original construction, to the extent of one billion, three hundred thirty-six million, eight hundred ninety-eight thousand, four hundred (1,336,898,400) cubic feet of water each year; and that said Lake Cheesman be given priority No. 3 by construction therefor.

It is Further Ordered, Adjudged and Decreed: That claimant, its successors and assigns, and the lawful owners of said Lake Cheesman have further appropriated for storage purposes and have a further priority of appropriation as by enlargement to take effect on the 24th day of September, A. D. 1893, and be entitled to further take, divert, impound and store, in addition to the said priority No. 3 by original construction as of the date and to the extent and amount as aforesaid, from the unappropriated waters flowing in said Lost Park or Goose creek and in Turkey creek and their tributaries, and in the South Fork of the South Platte river and in all its tributaries, above the dam of said Lake Cheesman, and flood waters and waters flowing in the non-irrigation season, and by replenishing to maintain, so far as said unappropriated water flowing in said natural streams are sufficient and will permit, as of said date, the same being the date of the commencement of the work of the construction of said Lake Cheesman reservoir, and which date, for the reasons and consideration herein set forth, shall be and hereby is directed and ordered to be, taken and deemed as the date of the first enlargement of said
1155 Lake Cheesman, to the extent of two billion, one hundred seven million, one hundred forty-thousand and twelve (2,107,140,012) cubic feet of water each year; and that said Lake Cheesman be given priority No. 7 by first enlargement therefor.

It is Further Ordered, Adjudged and Decreed: That said claimant, its successors and assigns, and the lawful owners of said Lake Cheesman, to take effect as of the dates and to the extent of the quantities as aforesaid, be authorized and permitted to take divert, impound, store, hold and use, and by replenishing whenever and as often as may be necessary to maintain such storage, to the full capacity of said Lake Cheesman once each year, towit, three billion, four hundred forty-four million, thirty-eight thousand, four hundred and twelve (3,444,038,412) cubic feet of water, from the natural streams and sources of supply aforesaid, and to draw from such storage at any time water in any amount for its or their beneficial uses and purposes.

And it is Further Ordered, Adjudged and Decreed that this decree shall not be taken, held or deemed as in any wise limiting or restricting the uses or purposes to which the waters now or hereafter diverted, stored and impounded in said Lake Cheesman may be beneficially

applied or as in anywise having the effect of a waiver of, or foreclosing or determining, the right of said claimant and its said lessee, and their successors and assigns, and the lawful owners of said Lake Cheesman, to make beneficial application of said waters to any or all of the purposes and uses specified and enumerated in said maps and statements of claim duly filed as aforesaid in the office of the Colorado State Engineer, or as in anywise barring or estopping them from asserting and maintaining such right in any other proceeding or proceedings.

STATE OF COLORADO,
County of Park, ss:

I, A. F. Willmarth, clerk of the district court of the County of Park, state aforesaid, do hereby certify the above and foregoing to be a true, complete and perfect transcript and copy of the decree of said court had and entered of record in a certain cause in
1156 said court lately pending entitled "In the matter of Priorities of Water Rights in Water District No. 23 in the State of Colorado, on Petition of the South Platte Canal and Reservoir Company for the Adjudication of Water Rights of Lake Cheesman, for beneficial purposes other than irrigation," as the same now remains on file and of record in this office, so far as said decree relates to Reservoir No. 3, Lake Cheesman.

In Testimony Whereof, I have hereunto set my hand and affixed the seal of said court, at my office in Fairplay, and in said County and State, this 31st day of May, A. D. 1913.

[Seal of Park County District Court.]

A. F. WILLMARTH, *Clerk.*

(Endored:) No. 34561. File No. 147, Doc. No. 79, District Court, Park Co. to Denver Union Water Co., 6274. U. S. District Court. District of Colorado. Decree. Cert'd Copy. (South Platte Canal and Reservoir Co.) Plaintiff's Ex. Q. Filed Oct. 6, 1916, Charles W. Bishop, Clerk. State of Colorado, Douglas County, ss. I hereby certify that this instrument was filed for record in my office at 8.5 o'clock a. m. June 13, 1913, and is duly recorded in Book 45 page 119. Harry Jones, Recorder by Wm. C. Jones, Deputy. Fees $7.50 Paid. State of Colorado, County of Jefferson, ss. I hereby certify that this instrument was filed for record in my office at 10:30 o'clock A. M., July 16, A. D. 1913, and recorded in Book 183, on page 170. I. S. T. Gregg, Recorder. —— —— Deputy. No. —. Fees $8.10. **Pd.**

(Here follow maps marked pp. 1157 & 1157*a*.)

(Here follows Complainant's Exhibit Z, marked page 1158.)

CHARTS

TOO

LARGE

FOR

FILMING

Statement of Actual Cost of Additions, Extensions, and Betterments of Property in the Syste
nance No. 163 of the Series of 1907, to March 31, 1914, Not Including That Portion o

	From appraisement to October 31, 1908.	1909.	
City Pipe System	$72,084.14	$27,068.48	$
Improvements Harriman Ranch	.....	775.35	
Improvements West Denver Conduit	.....	.....	
Improvements Capitol Hill Works	10,614.87	115.55	
Improvements Ashland Avenue Works	23,496.99	280.80	
Capitol Hill Reservoir	.....	.....	
Morrison Pipe Line	2,712.60	2,372.45	
Real Estate, North Denver	.....	.....	
Miscellaneous—S. P. C. & R. Co. Property	9,406.87	3,090.28	
First Conduit Extension	4,697.56	.....	
Sixth Conduit	.....	2,748.93	
Soda Lakes Reservoir and Mineral Water Company Capital Stock	.....	.....	
Real Estate, Mississippi Street Galleries	.....	.....	
New Buildings, Wynetka	.....	.....	
Betterments, Littleton Heights	.....	.....	
Platte Canon Ranch	.....	.....	
Part Interest in Mill Ditch	.....	.....	
Third Conduit Extension	.....	.....	
Electric Booster Pumps	.....	.....	
Betterments University Park Works	.....	.....	
Improvements Platte Canon Filters	.....	.....	
Seventh Conduit	.....	.....	
Eighth Conduit	.....	.....	
Extension Eighth Conduit	.....	.....	
New University Park Pumping Works	.....	.....	
Improvements Marston Lake Filters	.....	.....	
Bergen Ditch Water Rights	.....	.....	
Improvements West Denver Yard	.....	.....	
Improvements Second Conduit	.....	.....	
Experimental Meters	.....	.....	
Betterments Capitol Hill Pumping Works	.....	.....	
Improvements Third Conduit	.....	.....	
Improvements Marston Lake	.....	.....	
Real Estate, Jefferson County	.....	.....	
Surveys	518.45	11,591.89	
Special Assessments	73.87	795.69	
Discount and Expenses on Bonds Sold	36,080.91	.....	
Total	$159,686.26	$48,839.42	$
Less Real Estate Sold	.....	586.20	
Remainder.—Being net direct charges comprising the actual cost of additions, extensions, and betterments, not including that portion of Office, Legal, and General Expenses properly chargeable to such construction	$159,686.26	$48,253.22	$

(Endorsed:) 6274. U. S. District Court, District of Colorado. Plaintiff's Exhibit Z.

COMPLAINANT'S EXHIBIT Z.

Case No. —.

The Denver Union Water Company.

Extensions, and Betterments of Property in the System of the Company Since the Appraisement Pursuant to City and County of Denver Ordi-
1907, to March 31, 1914, Not Including That Portion of Office, Legal, and General Expenses Properly Chargeable to Such Construction.

	From appraisement to	Year ended October 31.					Five months ended	
	October 31, 1908.	1909.	1910.	1911.	1912.	1913.	March 31, 1914.	Total.
.....	$72,084.14	$27,068.48	$119,204.87	$142,496.61	$59,042.24	$91,674.97	$4,624.47	$516,195.78
.....	.....	775.35	.....	.....	.....	.....	.....	775.35
.....	.....	.....	.....	863.63	.....	.....	.....	863.63
.....	10,614.87	115.55	.....	.....	.....	.....	.....	10,730.42
.....	23,496.99	280.80	.....	212.30	.....	.....	.....	23,990.09
.....	.....	.....	.....	807.46	.....	.....	.....	807.46
.....	2,712.60	2,372.45	61.67	.....	.....	.....	.....	5,146.72
.....	.....	.....	.....	.....	69.97	.....	.....	69.97
ty.....	9,406.87	3,090.28	4,430.01	779.47	620.69	701.99	3,647.39	22,676.70
.....	4,697.56	.....	.....	.....	.....	.....	.....	4,697.56
.....	.....	2,748.93	351,872.97	706.54	.....	.....	.....	355,388.44
r Company Capi-								
.....	.....	.....	10,500.00	.....	.....	.....	.....	10,500.00
.....	.....	.....	400.85	.....	.....	.....	.....	400.85
.....	.....	.....	12,492.62	2,769.21	227.35	.....	.....	15,489.18
.....	.....	.....	437.63	1,543.73	508.13	76.99	.....	2,566.48
.....	.....	.....	824.75	11,805.88	2,336.35	128.53	.....	14,838.45
.....	.....	.....	12,500.00	1,090.69	91.00	.....	.....	13,681.69
.....	.....	.....	.....	36,393.71	.....	.....	.....	36,393.71
.....	.....	.....	.....	979.57	.....	.....	.....	979.57
.....	.....	.....	.....	1,972.89	.....	.....	.....	1,972.89
.....	.....	.....	.....	1,295.67	.....	.....	503.91	1,799.58
.....	.....	.....	.....	271,274.69	653.88	.....	.....	271,928.57
.....	.....	.....	.....	6,205.84	232,536.18	1,035.10	.....	239,777.12
.....	.....	.....	.....	1,960.80	19,638.95	417.20	.....	21,182.55
.....	.....	.....	.....	7,011.86	3,540.43	.....	.....	10,552.29
.....	.....	.....	.....	29.56	445.89	.....	.....	475.45
.....	.....	.....	.....	1,620.00	252.00	.....	.....	1,872.00
.....	.....	.....	.....	2,529.79	179.07	.....	.....	2,708.86
.....	.....	.....	.....	.....	6,942.36	.....	.....	6,942.36
s.....	.....	.....	.....	.....	946.43	.....	.....	946.43
.....	.....	.....	.....	.....	.....	1,046.16	.....	1,046.16
.....	.....	.....	.....	.....	.....	8,603.45	1,578.02	10,181.47
.....	.....	.....	.....	.....	.....	3,729.34	627.08	4,356.42
.....	518.45	11,591.89	1,733.48	3,064.82	.....	501.30	.....	501.30
.....	73.87	795.69	.....	.....	79.11	5,262.78	.....	22,250.53
.....	36,080.91	.....	20,770.12	57,400.00	30,800.00	295.95	.....	1,165.51
						3,716.25	.....	148,767.28
.....	$159,686.26	$48,839.42	$535,228.97	$554,874.72	$358,910.03	$116,098.55	$10,980.87	$1,784,618.82
.....	.....	586.20	38,001.70	1,190.00	.....	.....	.....	39,777.90
comprising the betterments, not and General Ex- struction.....	$159,686.26	$48,253.22	$497,227.27	$553,684.72	$358,910.03	$116,098.55	$10,980.87	$1,744,840.92

Court, District of Colorado. Plaintiff's Exhibit Z. Filed Oct. 6, 1915. Charles W. Bishop, Clerk.

1159 Case No. —.

COMPLAINANT'S EXHIBIT No. ZZ.

(Copy.)

This agreement, made the sixteenth day of December in the year Eighteen hundred and Seventy between the City of Denver in the Territory of Colorado, by the Mayor of said City of the first part, and the Denver City Water Company by their President of the second part, Witnesseth:

That for and in consideration of the agreements and covenants hereinafter mentioned to be made and performed by the party of the second part, the party of the first part doth hereby grant unto the said party of the second part the sole and exclusive right to lay pipes for the distribution of water within the city limits of said City of Denver and any additions that may hereafter be made thereto, and in consideration of said grant the said party of the second part hereby covenants and agrees to and with the party of the first part to lay within one year from the Eighth day of December, A. D. 1870, at least three miles of main distributing pipe within said city limits and supply the same with water, and to extend the same from time to time thereafter so as to meet the demand for the same as fast as possible, and the said party of the second part further covenants and agrees as aforesaid to erect hydrants on the line of said main pipe at all points that the said party of the first part may from time to time direct said party of the first part paying the party of the second part therefor the actual cost of erecting the same, said hydrants each to furnish a supply of water for the use of the Fire Department of said city not less in quantity than one stream forced through a nozzle one inch in diameter to a height of seventy-five feet above the grade of said city at the intersection of Larimer and F streets, such supply to be continuous unless cut off by accident or casualty and in such event the party of the second part shall make all reasonable
1160 effort to repair the same immediately, and the party of the second part further covenants and agrees as aforesaid that the party of the first part shall have free and uninterrupted use of the water from said hydrants or fire plugs for the purpose of washing gutters and watering streets. And the party of the first part hereby covenants and agrees to pay the party of the second part for the use of water from said hydrants as aforesaid the sum of one hundred and fifty dollars annually for each hydrant from the time the same are erected and ready for use as aforesaid, to be paid quarterly on the first days of January—April—July—and October in each and every year. The party of the second part hereby covenants and agrees as aforesaid to furnish water to the occupants of houses and other persons along the line of the water pipes for domestic use and other purposes at rates not to exceed those charged by the city of St. Louis, in the State of Missouri to its inhabitants. And it is further agreed by and between the parties to these presents that at the expiration

of the term of twenty years from the said Eighth day of December in the year Eighteen hundrd and seventy the said party of the first part may at their option purchase the said water works with its appurtenances from the party of the second part, yielding and paying therefor to the party of the second part such sum or sums of money to be determined by an appraised valuation of the same. Said valuation to be made by five disinterested persons as appraisers, two of whom shall be appointed by each of the parties to these presents and the four so appointed shall appoint a fifth. Any three of whom when so appointed, agreeing may fix said valuation.

In witness whereof the said party of the first part have hereunto caused the common seal of the City of Denver to be affixed the day and year first above written.

[Seal, City of Denver.]

CITY OF DENVER,
By B. B. STILES, *Mayor.*

Attest:
GEO. T. CLARK, *City Clerk.*

By the City Council Clerk and the party of the second part by the President of the Denver City Water Company have hereunto
1161 set their corporate seal by the hands of their President and their President has hereunto subscribed his name the day and year first above written.

[Denver City Water Co. Corporate seal.]

DENVER CITY WATER COMPANY,
By JAMES ARCHER, *President.*

(5c Int. Revenue Stamp.)

(Endorsed:) D. U. W. Co. File No. 238, Doc. No. 1C. 6274. U. S. District Court, District of Colorado. Plaintiff's Exhibit Z-Z. Filed Oct. 6, 1915. Charles W. Bishop, Clerk.

1162 Case No. —.

COMPLAINANT'S EXHIBIT No. A-1.

Contract With the City of Denver.

This Agreement, made this ninth day of May, A. D. one thousand eight hundred and seventy-four, between the city of Denver, a municipal corporation, organized under and by virtue of an act of the legislature of the terrirtory of Colorado, by the Mayor of said city, of the first part, and the Denver City Water Company, by their President, of the second part.

Witnesseth: That for and in consideration of the covenants and agreements hereinafter mentioned, to be done and performed by the party of the second part, the party of the first part doth hereby

grant unto the party of the second part, the sole and exclusive right to lay pipes for the distribution of water within the city limits of the said city of Denver, and any additions that may hereafter be made thereto, for the period of seventeen years from the date of this agreement; and in consideration of said grant, and other considerations hereinafter mentioned, the said party of the second part hereby covenants and agrees to and with the said party of the first part, to lay, each and every year during the continuance of this agreement, in and along the streets of the said city of Denver, one and one-half miles of main distributing pipes, in addition to the pipes now in use in the said city, the said pipes not to be less than five inches in diameter, and to supply the same with water; and that in measuring the said one and one-half miles of pipe to be laid each year, as aforesaid, no pipe shall be measured or estimated on more than two sides of any one square or block, nor shall any pipes be measured, in estimating the said one and one-half miles of pipe, within the limits of any water pipe now laid in said city; and that the said one and one-half miles of pipe to be laid annually, as aforesaid, shall be laid along those streets where it will afford
1163 protection from fire to the greatest number of inhabitants, and shall be laid outside the limits above mentioned.

And the said party of the second part further covenants and agrees with the said party of the first part, to erect hydrants on the line of any of the pipes now laid or hereafter to be laid by the said party of the second part in the said city, at all points where the said party of the first part may from time to time direct, said party of the first part paying to said party of the second part therefor the actual cost of erecting the same; said hydrants each to furnish a supply of water for the use of the fire department of said city, not less in quantity than one stream forced through a nozzle one inch in diameter to a height of sixty feet above the grade of any street whereon the hydrant with which such nozzle is connected is erected, and at the point of such street whereon such hydrant is erected, such supply to be continuous, unless cut off by accident or casualty; and in such event the party of the second part shall make all reasonable effort to repair the same immediately.

And the party of the second part further covenants and agrees that the party of the first part shall have the free and uninterrupted use of the water from said hydrants or fire plugs, for the extinguishment of fires and for the use of the fire department, and the purpose of washing gutters and watering streets.

And party of the first part hereby covenants and agrees to pay the said party of the second part, for the use of water from said hydrants, as aforesaid, the sum of twenty thousand dollars ($20,000) per year, for the period of seventeen years from the date hereof, to be paid semi-annually, on the first days of June and Dec. of each and every year of the said seventeen years.

The party of the second part further covenants and agrees as aforesaid, to furnish water to the occupants of houses, and to other persons along the line of the water pipes, for domestic use and other

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purposes, at rates not to exceed those charged by the city of St. Louis, in the state of Missouri, to its inhabitants.

1164 And It Is Further Agreed, by and between the parties to these presents, that at the expiration of five years from the date hereof, or at the expiration of ten years from the date hereof, or at the expiration of the said term of seventeen years from the date hereof, the said party of the first part may, at their option, purchase the said water works, with its appurtenances, from the party of the second part, yielding and paying therefor to the party of the second part such sum or sums of money to be determined by an appraised valuation of the same, said valuation of the same to be made by five disinterested appraisers, two of whom shall be appointed by each of the parties to these presents, and the four so appointed shall appoint the fifth, any three of whom, when so appointed, may fix said valuation.

And It Is Further Agreed, by and between the parties to these presents, that during the continuance of this contract, the said party of the second part shall furnish as good a quality of water for domestic purposes as it has heretofore done and is now doing, and that the present and future purity of said water may be determined, it is hereby stipulated that there shall be an analysis of the water as now furnished, by competent persons, which analysis shall be signed by the parties to this agreement, and spread of record upon the records of the said city of Denver, and which analaysis shall be taken as the standard of all future tests.

And It Is Further Agreed, that all contracts heretofore entered into between the parties to these presents, are hereby absolutely annulled and held for naught, and that if the party of the second part shall fail to perform either or every of the acts incumbent on him by these presents, and at the time and in the manner herein specified, then this and all previous contracts between the parties to these presents shall be void.

This Agreement to be in force from and after the first day of May, one thousand eight hundred and seventy-four.

1165 In Witness Whereof, the said party of the first part have hereunto caused the common seal of the city of Denver to be affixed, the day and year first above written.

City of Denver, Colorado, Incorporated November 7, 1861.

CITY OF DENVER,
By WILLIAM J. BARKER, *Mayor.*

Attest:

CHARLES F. LEIMER,
City Clerk.

And the party of the second part, by the President of the Denver City Water Company, have hereto set their corporate seal, by the

hands of their President, and their President has hereunto subscribed his name, the day and year first above written.

[Denver City Water Company.]

(Signed) DENVER CITY WATER COMPANY,
By JAMES ARCHER, *President.*

Attest:
R. R. McCORMICK, *Secretary.*

DENVER, COLORADO,
City Clerk's Office:

I hereby certify that the above and foregoing is a true and correct copy of Ordinance — as contained in the records in this office.

Witness my hand and the corporate seal of the City of Denver this 13" day of May, A. D. 1891.

[SEAL.] J. J. VICK ROY,
City Clerk.

(Endorsed:) D. U. W. Co. File No. 238, Doc. No. 2*a*. 6274. U. S. District Court, District of Colorado. Plaintiff's Exhibit A-1. Filed Oct. 6, 1915, Charles W. Bishop, Clerk.

1166 (Corrected.)

[By Authority.]

Case No. —.

COMPLAINANT'S EXHIBIT No. A-2.

Ordinance No. 119, 1889.

A Bill For An Ordinance Granting To The Citizens' Water Company The Right to Lay and Maintain Water Mains, and to Connect Service Pipe Therewith, in the Streets, Avenues and Alleys in the City of Denver and the Additions Thereto and That May Hereafter Be Made Thereto.

Be it Enacted by the City Council of the City of Denver:

Section 1. That there be and hereby is granted unto the Citizens' Water Company the right to lay and maintain water mains and to make necessary connections therewith of service pipes for the distribution of water in, through and along the public streets, avenues and alleys of the city of Denver, hereinafter in this ordinance specifically mentioned, and to repair, remove or replace such water mains as necessity may from time to time require.

Sec. 2. Nothing in this ordinance shall be construed as granting unto the said The Citizens' Water Company any exclusive right or privilege, or to prevent the granting of similar rights and privileges to others for like purposes.

Sec. 3. The franchise and privilege hereby granted are granted upon the express condition that the city of Denver shall have the right at any time to purchase the plant, rights and properties of the said The Citizens' Water Company upon the valuation of the value of such plant, lands, water rights and machinery at the time of such purchase by the city, less the deterioration in the same from use and wear; which valuation is to be determined by the appraisement of three disinterested parties, one to be selected by The Citizens' Water Company, one by the city of Denver, and the third to be selected by the two thus chosen; and upon the further condition that the said Citizens' Water Company shall not charge the inhabitants of premises along the line of its mains within the corporate limits of the city of Denver for water for the purposes required by them any greater rates therefor than the present rates charged to the inhabitants of the city of Denver for water for like service; and upon the further condition that the said The Citizens' Water Company shall at the end of three years from the passage of this ordinance have in operation at least forty miles of water mains within the city limits of the city of Denver, and thereafter shall lay and operate at least three miles of water mains additional thereto each year during the existence of this franchise; and upon the further condition that the said The Citizens' Water Company shall not sell out its plant, rights or privileges to, or consolidate with or pool rates with any other water company furnishing water in said city of Denver. Any violation of these conditions shall work a forfeiture of the privileges and the franchises granted herein; provided that the said city of Denver shall not on or before the ninth day of May, A. D. 1891, elect to purchase the plant, lands, water rights and machinery of the said Citizens' Water Company as above herein provided, and shall at that time enter into a contract with the said The Citizens' Water Company to furnish water for the uses and purposes of the city of Denver for extinguishing fires, sprinkling streets, flushing gutters and sewers, upon terms and conditions to be mutually agreed upon by and between the said Citizens' Water Company and the said city of Denver; and in case of inability to so agree upon the rates to be paid by the said city to the said Citizens' Water Company, for water for the uses aforesaid, such rates shall be fixed and determined by the President of the Board of Supervisors, the President of the Board of Alderman and two persons to be selected by the said Citizens' Water Company, and one other person to be selected and chosen by the senior judge of the district court within and for the county of Arapahoe.

Sec. 4. That before exercising any of the rights granted by this ordinance, the said The Citizens' Water Company shall file a bond in the penal sum of twenty thousand ($20,000) dollars, with two or more sureties to be approved by the Mayor, conditioned that it will properly fill all excavations and openings made by it,
1167 and that it will assume and pay all damages for personal and other injuries that may happen either to private persons or to corporations, as well as to the City of Denver, resulting from or occasioned by any negligence or want of care on the part of the said The Citizens' Water Company in the work of laying, maintaining,

repairing or removing its said water mains or making connections therewith; and that it will preserve and save harmless the City of Denver from all liability or expense to which it may be subject, or for which it may be held liable on account of any injury resulting from or caused by such, or any negligence on the part of the said The Citizens' Water Company as aforesaid; and will indemnify and save harmless the said City of Denver of and from all damages, costs, charges and expenses to which it may be subject or adjudged liable for or on account of any infringing upon the existing rights of any other corporation by The Citizens' Water Company.

Sec. 5. The City Council of the city of Denver shall prescribe, by ordinance, reasonable rules and regulations for the proper protection of water mains and fire hydrants, and to prevent the undue waste of water and the use thereof by persons not entitled to use the same.

Sec. 6. The rights and privileges hereby granted may be exercised and enjoyed for the period of twenty years from and after the passage of this ordinance and no longer.

Sec. 7. That the rights and privileges hereby granted shall extend and be confined to the following streets, avenues and alleys of the city of Denver, and to all extensions thereof, towit: First street from the city limits to Fifteenth avenue, Second street from Wazee to Fifteenth avenue, Third street from the city limits to Fifteenth avenue, Fourth street from Platte river to Fifteenth avenue, Fifth street from Wewatta to Fifteenth avenue, Sixth street from Wewatta to Fifteenth avenue, Seventh street from city limits to Fifteenth avenue, Eighth street from Pierce street to Fifteenth avenue, Ninth street from Pierce street to Fifteenth avenue, Tenth street from Pierce street to Fifteenth avenue, Eleventh street from Wewatta to Fifteenth avenue, Twelfth street from Wewatta to Cherry Creek, Thirteenth street from Wewatta to Cherry Creek, Fourteenth street from Holladay to Fifteenth avenue, Fifteenth street from Mary to Fifteenth avenue, Sixteenth street from junction of Fay street to Broadway, Seventeenth street from Fairview avenue to Broadway, Eighteenth street from Fairview avenue to Broadway, Nineteenth street from Fairview avenue to Broadway, Twentieth street from Delgany to Welton street, Twenty-first street from Stanton to Grant avenue, Twenty-second street from Wazee to Parkinson street, Twenty-third street from Wazee to Fifteenth avenue, Twenty-fourth street from Wazee to Pierpont, Twenty-fifth street from Market to Larimer and Curtis to Pierpont (if at any future time the street is opened from Larimer to Curtis, that portion of the street also), Twenty-sixth street from Wazee to Larimer and Curtis to Pierpont, and from Larimer to Curtis if at any time street there is opened, Twenty-seventh street from Wazee to Welton, Twenty-eighth street from Wazee to Glenarm, Twenty-ninth street from Wazee to Downing avenue, Thirtieth street from Wazee to Downing avenue, Thirty-first street from Quincy to Downing avenue, Thirty-second street from Wazee to Downing avenue, Thirty-third street from Wazee to Downing avenue, Thirty-fourth street from Wazee to Downing avenue, Thirty-fifth street from Platte river to Downing avenue, Thirty-sixth street from Platte river to Downing avenue, Thirty-eighth

street from Platte river to Larimer, Thirty-ninth street from Platte river to Wazee, Fortieth street from Wewatta to Larimer, Forty-first street from city limits to Wewatta, Forty-fourth street from city limits to Wewatta, Cleveland place from Fifteenth avenue to Broadway, Court Place from Fifteenth avenue to Broadway, Tremont street from Fifteenth avenue to Broadway, Glenarm street from Fifteenth avenue to Downing avenue, Welton street from Fifteenth avenue to Downing avenue, California street from Fifteenar avenue to Downing avenue, Stout street from Fifteenth avenue to Downing avenue, Curtis street from Fifteenth avenue to Downing avenue, Champa street from Fifteenth avenue to Downing avenue, Arapahoe street from Cherry Creek to Downing avenue, Lawrence street from Fifteenth avenue to Downing avenue, Larimer street from Grand avenue to Downing avenue, Holladay street from Platte river to Twenty-third street, Market street from Twenty-third street
1168 to Marshall street, Blake street from Thirteenth street to Fortieth street, Wazee street from Platte river to Twentieth street, Wyncoop street from Platte river to city limits, Wewatta street from Cherry Creek to city limits, Delgany street from Cherry Creek to city limits, Bassett street from Fifteenth street to Sixteenth street, Water street from city limits to Platte river, Platte street from city limits to Nineteenth street, Pierce street from city limits to Platte street, Frances street from city limits to 14th street, Johns street to Mary street, Ashland avenue from city limits to Mary street, Fay street from city limits to Mary street, Bigler street from city limits to Erie street, Fairview avenue from city limits to Palmer street, Gray street from Pierce street to Prospect avenue, Bert street from Pierce street to Prospect avenue, Mary street from Pierce street to Fairview avenue, Goss street from Fairview avenue to Prospect avenue, Arlington street from Fairview avenue to Humphrey street, Witter street from Fairview avenue to Humphrey street, Clear Creek avenue from Fairview avenue to city limts, Bayard street from city limits to city limits, Alameda avenue from Platte river to city limits, Buyers street from Platte river to Broadway, Cedar street from Platte River to city limits, Maple street from Evans street to city limits, Ellsworth street from Platte river to city limits, West First avenue from Platte river to Broadway, First avenue from Broadway to city limits, West Second avenue from Platte river to Broadway, Second avenue from Broadway to city limits, West Third avenue from Platte River to Broadway, Third avenue from Broadway to city limits, West Fourth avenue from Platte river to Broadway, Fourth avenue from Broadway to city limits, West Fifth avenue from Platte river to Broadway, Fifth avenue from Broadway to city limits, West Sixth avenue from Platte river to Broadway, Sixth avenue from Broadway to city limits, West Seventh avenue from Platte river to Broadway, Seventh avenue from Broadway to city limits, West Eighth avenue from Platte river to Broadway, Eighth avenue from Broadway to city limits, West Ninth avenue from Platte river to Broadway, Ninth avenue from Broadway to city limits, West Tenth avenue from Platte River to Broadway, Tenth avenue from Broadway to city limits, West Eleventh avenue

from Platte river to Broadway, Eleventh avenue from Broadway to city limits, West Twelfth avenue from Platte river to Broadway, Twelfth avenue from Broadway to city limits, West Thirteenth avenue from Platte river to Broadway, Thirteenth avenue from Broadway to city limits, West Fourteenth avenue from Platte river to Broadway, Fourteenth avenue from Broadway to city limits, West Fifteenth avenue from city limits to Broadway, Fifteenth avenue from Broadway to city limits, Sixteenth avenue from Broadway to city limits, Seventh avenue from Broadway to city limits, Eighteenth avenue from Broadway to city limits, Nineteenth avenue from Broadway to Downing avenue, Twentieth avenue from Broadway to Downing avenue, Twenty-first avenue from Downing avenue to city limits, Twenty-second avenue from Pierpont to city limits, Twenty-third avenue from Pierpont to city limits, Twenty-fourth avenue form Pierpont to city limits, Twenty-fifth avenue from Pierpont to city limits, Twenth-sixth avenue from Pierpont to city limits, Twenty-seventh avenue from Downing avenue to city limits, Twenty-eighth avenue from Downing avenue to city limits, Twenty-ninth avenue from Downing avenue to city limits, Thirtieth avenue from Downing avenue to city limits, Thirty-first avenue from Downing avenue to city limits, Thirty-second avenue from Downing avenue to city limits, Thirty-third avenue from Downing avenue to city limits, Thirty-fourth avenue from Dwning avenue to city limits, Thirty-fifth avenue from Downing avenue to city limits, Thirty-sixth avenue from Downing avenue to city limits, Thirty-seventh avenue from Downing avenue to city limits, Thirty-eighth avenue from Franklin street to city limits, Thirty-ninth avenue from Franklin street to city limits, Fortieth avenue from Franklin street to the junction of York and Pacific, South Seventh street from Fifteenth avenue to Burnham, South Eighth street from Fifteenth avenue to city limits, South Ninth street from Fifteenth avenue to city limits, South Tenth street from Fifteenth avenue to city limits, South Eleventh street from Fifteenth avenue to city imits, Santa Fe street from Fifteenth avenue to city limits, Clark street from Fifteenth avenue to city limits, South Water street from Fifteenth avenue to city limits, South Twelfth street from Fifteenth avenue to
1169 city limits, South Tremont street from Fifteenth avenue to city limits, South Thirteenth street from Fifteenth avenue to city limits, Evans street from Fifteenth avenue to city limits, South Fourteenth street from Fifteenth avenue to Ellsworth street, South Fifteenth street from Fifteenth avenue to Ellsworth street, Broadway from Welton street to city limits, Lincoln avenue from Twentieth avenue to city limits, Sherman avenue from Twentieth avenue to city limits, Grant avenue from Pierpont street to city limits, Logan avenue from Twentieth avenue to city limits, Wasoola street from Twentieth avenue to Pierpont street, Parkinson street from Twentieth avenue to Pierpont, Pennsylvania avenue from Twentieth avenue to city limits, Pearl street from Twentieth avenue to city limits, Washington street from Twentieth avenue to city limits, Clarkson street from Twentieth avenue to city limits, Venice street from Fiftenth avenue to city limits, Atla street from Fifteenth

avenue to city limits, Corona street from Fifteenth avenue to city limits, Hallett street from Fourteenth avenue to city limits, Corsline street from Fourteenth avenue to city limits, Inslee street from Fifteenth avenue to city limits, Hunt street from Fifteenth avenue to city limits, Frankline street from Fortieth avenue to city limits, Gilpin street from Fortieth avenue to city limits, Williams street from Fortieth avenue to city limits, High street from Fortieth avenue to city limits, Race street from Fortieth avenue to city limits, Vine street from Fortieth avenue to city limits, Green street from Fortieth avenue to city limits, York street from Fortieth avenue to city limits, Josephine avenue from Twenty-sixth avenue to Fortieth avenue, Columbine avenue from Twenty-sixth avenue to Fortieth avenue, Murdock avenue from Twenty-sixth avenue to Fortieth avenue, Clayton from Twenty-sixth avenue to Fortieth avenue, Filmore avenue from Twenty-sixth avenue to Fortieth avenue, Finlay avenue from Twenty-sixth avenue to Fortieth avenue, Clenman avenue from Twenty-sixth avenue to Fortieth avenue, Walnut street from city limits to Thirty-seventh street, Estes street from Marshall to city limits, Legge street from Marshall street to city limits, Parsons street from Marshall street to city limits, Stallcup street from Marshall street to city limits, Apple street from Marshall street to city limits, Banana street from Pacific street to city limits, Cherry street from Pacific street to city limits, Damson street from Pacific street to city limits, Elder street from Pacific street to city limits, Fruit street from Pacific street to city limits, Grape street from Pacific Street to city limits, Hazel street from Pacific street to city limits, Lemon street from city limits to city limits, Melon street from city limits to city limits, Orange street from city limits to city limits, Plum street from city limits to city limits, Miner street from Estes street to city limits, Barnum street from Estes street to city limits, Marshall street from Apple street to city limits, Louis street from Damson street to city limits, Randolph street from Damson street to city limits, Pacific street from Apple street to city limits, East Larimer from Josephine to Allen avenue, East McClennan street from Josephine to Allen avenue, Allen avenue from Twenty-seventh street to Pacific street, Downing avenue from Fifteenth avenue to Market street, Pierpont street from Twentieth avenue to Welton street, Hotchkiss street from Fifteenth avenue to Twenty-sixth avenue, Ogden street from Fifteenth avenue to Twtnty-sixth avenue, Marion street from Fifteenth avenue to Twenty-seventh avenue, Lafayette street from Fifteenth avenue to Twenty-seventh avenue, Humboldt street from Fifteenth avenue to Twenty-seventh avenue, Backus street from Edmunds street to city limits, Murdock street from Edmunds street to city limits, Scott street from Edmunds street to city limits, Kent street from Edmunds street to city limits, Wanless street from Edmunds street to city limits, Bell avenue from Nineteenth street to Gaston street, Palmer street from Nineteenth street to Gaston street, Clifton street from Nineteenth street to Gaston street, Justina street from Fairview avenue to Gaston street, Merrill street from Fairview avenue to Gaston street, Converse street from Fairview avenue to Gaston street, Edmunds street from Fairview

avenue to Gaston street, Everett street from Prospect avenue to Gaston street, Argo street from city limits to Gaston street, Lowell street from Prospect avenue to Gaston street, Quincy street from Prospect avenue to Gaston street, Prospect avenue from Argo street to city limits, Beecher avenue from Argo street to city limits, Greeley avenue
1170 from Argo street to city limits, Dakota avenue from Lowell street to city limits, Colorado avenue from Lowell street to city limits, Wyoming avenue from Lowell street to city limits, Erie street from Fairview avenue to Bigler, Boulder street from Fairview avenue to Mary, Central street from Fifteenth street to Nineteenth street, Cheyenne street from Fifteenth street to Broadway, Cheyenne street from Twentieth avenue to Pierpont, Hartford street from Nineteenth street to Stanton avenue, New Haven street from Eighteenth street to Division street, Division street from Stanton avenue to New Haven street, Stanton avenue from Twenty-first and McNassar to Platte River, McNassar avenue from Stanton avenue to Platte river, Corbett street from Stanton avenue to Platte river, Montgomery street from Stanton avenue to Platte river, Winne street from Stanton avenue to Platte river, Gerspach avenue from Stanton avenue to Sigler's Ditch, Williams street from Cherry creek to Sixteenth street, Center street from Platte river to Fifteenth street, Vintage street from West Thirteenth to water works, Maple street from West Thirteenth to water works, Titus street from West Thirteenth to water works, Walnut street from West Thirteenth to water works.

Alley between First and Second, from city limits to Fifteenth avenue, alley between Second and Third from city limits to Fifteenth avenue, alley between Third and Fourth from city limits to Fifteenth avenue, alley between Fourth and Fifth from Wewatta to Fifteenth avenue, alley between Fifth and Sixth from Wewatta to Fifteenth avenue; alley between Sixth and Seventh from city limits to Fifteenth avenue; alley between Seventh and Eighth from city limits to Fifteenth avenue, alley between Eighth and Ninth from Pierce street to Fifteenth avenue, alley between Ninth and Tenth from Pierce street to Fifteenth avenue, alley between Tenth and Eleventh from Pierce street to Fifteenth avenue, alley between Eleventh and Twelfth from Platte River to Fifteenth avenue, alley between Twelfth and Thirteenth from Wewatta to Cherry Creek, alley between Thirteenth and Fourteenth from Cherry Creek to Cherry Creek, alley between Bassett and Williams from Sixteenth to Fifteenth street, alley between Williams and Delgany from Seventeenth street to Cherry Creek, alley between Delgany and Wewatta from city limits to Cherry Creek, alley between Wewatta and Wyncoop from city limits to Cherry Creek, alley between Wyncoop and Wazee from Platte River to Twentieth street, alley between Wazee and Blake from Cherry Creek to Fourteenth avenue, alley between Blake and Holladay from Cherry Creek to Twenty-third avenue, alley between Blake and Market from Twenty-third street to Fortieth avenue, alley between Holladay and Larimer from Cherry Creek to Twenty-third street, alley between Market and Larimer from Twenty-third to Thirty-sixth street, alley between Market and Larimer from Thirty-seventh street to Thirty-ninth street, alley between Larimer and Law-

rence from Cherry Creek to Downing avenue, alley between Larimer and Arapahoe from Cherry Creek to Downing avenue, alley between Curtis and Arapahoe from Cherry Creek to Downing avenue, alley between Curtis and Champa from Cherry Creek to Downing avenue, alley between Champa and Stout from Cherry Creek to Downing avenue, alley between Stout and Champa from Cherry Creek to Downing avenue, alley between California and Welton from Fifteenth avenue to Downing avenue, alley between Welton and Glenarm from Fifteenth avenue to Broadway, alley between Glenarm and Welton from Twentieth to Pierpont, alley between Welton street and Glenarm from Twentieth street to Downing avenue, alley between Glenarm and Tremont from Fifteenth avenue to Broadway, alley between Glenarm and Grant from Twenty-sixth avenue to Pierpont, alley between Glenarm and Grant from Twenty-sixth avenue to Downing avenue, alley between Tremont and Court Place from Fifteenth avenue to Seventeenth street, alley between Court Place and Cleveland Place from Fourteenth street to Broadway, alley between Cleveland Place and Cheyenne street from Fifteenth avenue to Broadway, alley between Grant and Wasoola from Twentieth avenue to Pierpont, alley between Wasoola and Parkinson from Twentieth avenue to Pierpont, alley between Parkinson and Cheyenne street from Twentieth avenue to Pierpont, alley between city limits and Gray street from Pierce street to city limits, alley between Gray and Bert streets from Lake avenue to city limits, alley between Bert and Mary streets from Pierce street to city limits, alley between Fifteenth and Sixteenth streets from Platte River to Boulder street, alley
117! between Sixteenth and Seventeenth streets from Platte River to Erie street, alley between Seventeenth and Eighteenth streets from Platte River to Fairview avenue, alley between Eighteenth and Nineteenth from Platte River to Fairview avenue, alley between Goss street and Arlington from Fairview avenue to city limits, alley between Arlington and Witter from Fairview avenue to city limits, alley between Witter and Clear Creek avenue from Fairview to city limits, alley between Nineteenth and Fairview avenue and Bell avenue, from Bell avenue to Fairview avenue, alley between Clear Creek and Bell avenue from Fairview avenue to city limits, alley between Bell avenue and Palmer from Ninth street to city limits, alley between Palmer and Clifton streets from Fairview avenue to city limits, alley between Clifton and Justina streets from Fairview avenue to city limits, alley between Justina and Merrill from Fairview avenue to city limits, alley between Merrill and Converse from Platte River to city limits, alley between Converse and Edmunds from Platte River to city limits, alley between Everett and Argo from Platte River to city limits, alley between West Fourteenth avenue and Center street from First street to Fifth street, alley between Vintage and Maple from water works to West Thirteenth avenue, alley between Maple and Titus from water works to West Thirteenth avenue, alley from South Seventh and South Eighth from Cherry Creek to Fifteenth avenue, alley between South Eighth and South Ninth from Cherry Creek to Fifteenth avenue, alley between South Ninth and South Tenth from West First avenue to

Fifteenth avenue, alley between South Tenth and South Eleventh from West First avenue to Fifteenth avenue, alley between South Eleventh and Santa Fe from West Third to Fifteenth avenue, alley between Santa Fe and Clark from Alameda avenue to Fifteenth avenue, alley between Clark and South Water from Alameda avenue to Fifteenth avenue, alley between South Water and South Twelfth from Alameda avenue to Fifteenth avenue, alley between South Twelfth and South Tremont from Bayaud street to Fifteenth avenue, alley between South Tremont and South Thirteenth from West First avenue to Fifteenth avenue, alley between South Thirteenth and South Evans from West Sixth street to Fifteenth avenue, alley between Evans and South Fourteenth from Ellsworth street to Fifteenth avenue, alley between South Fourteenth to South Fifteenth from Ellsworth street to Fifteenth avenue, alley between South Fifteenth and Broadway from Ellsworth street to Fifteenth avenue, alley between Broadway and Lincoln from Alameda avenue to Twentieth avenue, alley between Lincoln and Sherman from Alameda avenue to Twentieth avenue, alley between Sherman and Grant from Alameda to Twentieth avenue, alley between Grant avenue and Logan avenue from Alameda avenue to Twentieth avenue, alley between Logan avenue and Pennsylvania from city limits to Twentieth avenue, alley between Pennsylvania and Pearl street from city limits to Twentieth avenue, alley between Pearl street and Washington avenue from city limits to Twentieth avenue, alley between Washington and Clarkson from city limits to Twntieth avenue, alley between Clarkson and Venice from city limits to Fifteenth avenue, alley between Venice and Alta from city limits to Fifteenth avenue, alley between Alta and Corona from city limits to Fifteenth avenue, alley between Corona and Hallett from city limits to Fifteenth avenue, alley between Corsline and Inslee from city limits to Fifteenth avenue, alley between Hallett and Corsline from city limits to Fifteenth avenue, alley between Inslee and Hunt from city limits to Fifteenth avenue, alley between Hunt and Franklin from city limits to Fifteenth avenue, alley between Franklin and Gilpin from city limits to Fortieth avenue, alley between Gilpin and Williams from city limits to Fortieth avenue, alley between Williams and High from city limits to Fortieth avenue, alley between High and Race from city limits to Thirty-seventh avenue, alley between Race and Vine from city limits to Thirty-seventh avenue, alley between Vine and Green from city limits to Thirty-seventh avenue, alley between Green and York from city limits to Thirty-seventh avenue, alley between Clarkson and Hotchkiss from Fifteenth avenue to Twenty-sixth avenue, alley between Hotchkiss and Ogden from Fifteenth avenue to Twenty-sixth avenue, alley between Ogden and Downing avenue from Fifteenth avenue to Twenty-sixth avenue, alley between Downing and
1172 Marion from Fifteenth avenue to Thirty-seventh avenue, alley between Marion and Lafayette from Fifteenth avenue to Thirty-seventh avenue, alley between Lafayette and Humboldt from Fifteenth avenue to Thirty-seventh avenue, alley between York street and Josephine from city limits to Pacific street, alley between Josephine and Columbine from city limits to Pacific street, alley between

Columbine and Murdock from city limits *to* Pacific street, alley between Murdock and Clayton from city limits to Pacific street, alley between Clayton avenue and Fillmore from city limits to Pacific street, alley between Fillmore and Finlay from city limits to Pacific street, alley between Finlay and Clellan from city limits to Pacific street, alley between Clellan and Walnut from city limits to Pacific street, alley between Estes and Legge from city limits to Marshall street, alley between Legge and Parsons from city limits to Marshall street, alley between Parsons and Stalleup from city limits to Marshall street, alley between Stalleup and Apple from city limits to Marshall street, alley between Apple and Banana from city limits to Pacific street, alley between Cherry and Damson from city limits to Pacific street, alley between Damson and Elder from city limits to Pacific street, alley between Elder and Fruit from city limits to Pacific street, alley between Fruit and Grape from city limits to Pacific street, alley between Grape and Hazel from city limits to Pacific street, alley berween Hazel and Lemon from city limtis to Pacific street, alley between Lemon and Melon from city limits to Pacific street, alley between Melon and Orange from city limits to Pacific street, alley between Orange and Plum from city limits to Pacific street.

(Signed) WALTER CONWAY,
President Board of Aldermen.

I do hereby certify that the foregoing is a correct engrossment of Alderman Bill No. 65 and the amendments thereto as passed by the Board of Aldermen.

DANIEL RYAN,
President Pro Tem. Board of Aldermen.
D. C. PACKARD,
President Board of Supervisors.

Signed and approved by me this 22d day of November, A. D. 1889.
WOLFE LONDONER,
Mayor.

Attested by the undersigned, with the corporate seal of the city of Denver.

[SEAL.] W. H. MILBURN,
City Clerk.

(Endorsed:) 6274. U. S. District Court, District of Colorado. Plaintiff's Exhibit A-2. Filed Oct. 6, 1915. Charles W. Bishop, Clerk.

1173 Case No. —.

[By Authority.]

COMPLAINANT'S EXHIBIT No. A-3

Ordinance No. 44, 1890.

A Bill for An Ordinance Continuing and Extending the Franchise and Privileges of the Denver Water Company, and Making a Contract With Said Company for the Supply of Water for Public and Private Purposes.

Be it enacted by the Council of the City of Denver:

Section I. The right and privilege of laying down, continuing and maintaining water pipes, valves, hydrants and appartus for the conveyance and distribution of water, in, upon, along and through the following streets, avenues, alleys and public places of the city of Denver, and additions thereto, to wit:

For the entire length of the following named streets and avenues:

First, Second, Third, Fourth, Fifth, Sixth, Seventh, Eighth, Ninth, Tenth, Eleventh, Twelfth, Thirteenth, Fourteenth, Fifteenth, Sixteenth, Seventeenth, Eighteenth, Nineteenth, Twentieth, Twenty-first, Twenty-second, Twenty-third, Twenty-fourth, Twenty-fifth, Twenty-sixth, Twenty-seventh, Twenty-eighth, Twenty-ninth, Thirtieth, Thirty-first, Thirty-second, Thirty-third, Thirty-fourth, Thirty-fifth, Thirty-sixth, Thirty-eighth, Thirty-ninth, Fortieth, Forty-first, Forty-second, Forty-third, Forty-fourth streets, Cleveland Place, Court Place, Tremont, Glenarm, Welton, California, Stout, Champa, Curtis, Arapahoe, Lawrence, Larimer, Market, Blake, Wozee, Wynkoop, Wewatta, Delgany, Bassett, Water, Platte, Pierce, Frances, John streets, Ashland avenue, Fay street, Bigler street, Fairview avenue, Gray, Bert, Mary, Goss, Arlington, Witter streets, Clear Creek avenue, Bayaud street, Alameda avenue, Byers, Cedar, Maple, Ellsworth streets, West First avenue, First avenue, West Second avenue, Second avenue, West Third avenue, Third avenue, West Fourth avenue, Fourth avenue, West Fifth avenue, Fifth avenue, West Sixth avenue, Sixth avenue, West Seventh avenue, Seventh avenue, West Eighth avenue, Eighth avenue, West Ninth avenue, Ninth avenue, West Tenth avenue, Tenth avenue, West Eleventh avenue, Eleventh avenue, West Twelfth avenue, Twelfth avenue, West Thirteenth avenue, Thirteenth avenue, West Fourteenth avenue, Fourteenth avenue, West Fifteenth avenue, Fifteenth avenue, Sixteenth avenue, Seventeenth avenue, Eighteenth avenue, Nineteenth avenue, Twentieth avenue, Twenty-first avenue, Twenty-second avenue, Twenty-third avenue, Twenty-fourth avenue, Twenty-fifth avenue, Twenty-sixth avenue, Twenty-seventh avenue, Twenty-eighth avenue, Twenty-ninth avenue, Thirtieth avenue, Thirty-first avenue, Thirty-second avenue, Thirty-third avenue, Thirty-fourth avenue, Thirty-fifth avenue, Thirty-sixth avenue,

Thirty-seventh avenue, Thirty-eighth avenue, Thirty-ninth avenue, Fortieth avenue, South Seventh street, South Eighth, South Ninth, South Tenth, South Eleventh streets, Santa Fe avenue, Clark, South Water, South Twelfth, South Tremont, South Thirteenth, Evans, South Fourteenth, South Fifteenth streets, Broadway, Lincoln avenue, Sherman avenue, Grant avenue, Logan avenue, Wasoola street, Parkinson street, Pennsylvania avenue, Pearl street, Washington, Clarkson, Venice, Alta, Corona, Hallett, Corsline, Inslee, Hunt, Franklin, Gilpin, Williams, High, Race, Vine, Green, York streets, Josephine avenue, Columbine avenue, Murdock avenue, Clayton, Filmore, Finley avenues, Clellan avenue, Walnut street, Estes, Legge, Parsons, Stallcup, Apple, Banana, Cherry, Damson, Elder, Fruit, Grape, Hazel, Lemon, Melon, Orange, Plum, Miller, Barnum, Marshall, Louis, Randolph, Pacific, East Larimer, East McClelland streets, Allen avenue, Downing avenue, Pierpont street, Emerson avenue, Ogden street, Marion, Lafayette, Humboldt, Backus, Edmunds, Murdock, Scott, Kent, Wanless streets, Bell avenue, Palmer street, Clifton, Justina, Merrill, Converse, Everett, Argo, Lowell, Quincy streets, Prospect avenue, Beecher avenue, Greeley avenue, Dakota avenue, Colorado avenue, Wyoming avenue, Erie street, Boulder, Central, Cheyenne, Hartford, New Haven, Division streets, Stanton avenue, McNassar avenue, Corbett street, Montgomery, Winnie streets, Gerspach avenue, William street, Center, Vintage, Maple, Logan, Elizabeth, Detroit, St. Charles, Cleveland, St. George, Milwaukee, St. Ann, St. Paul, St. Francis, Washington, Adams, Jefferson, Madison, Monroe, Charles, Jackson, Harrison streets, Colorado boulevard, Titus street, Grand avenue, Park avenue, Agricultural place, Commercial place and Cheyenne street.

1174 For the entire length of the following alleys:

Alley between First and Second streets, Second and Third streets, Third and Fourth streets, Fourth and Fifth streets, Fifth and Sixth streets, Sixth and Seventh streets, Seventh and Eighth streets, Eighth and Ninth streets, Ninth and Tenth streets, Tenth and Eleventh streets, Eleventh and Twelfth streets, Twelfth and Thirteenth streets, Thirteenth and Fourteenth streets, Bassett and Williams streets, Williams and Delgany streets, Delgany and Wewatta streets, Wewatta and Wynkoop streets, Wynkoop and Wazee streets, Wazee and Blake streets, Blake and Market streets, Market and Larimer streets, Larimer and Lawrence streets, Lawrence and Arapahoe streets, Arapahoe and Curtis streets, Curtis and Champa streets, Champa and Stout streets, Stout and California streets, California and Welton streets, Welton and Glenarm streets, Glenarm and Tremont streets, Glenarm street and Grant avenue, Tremont street and Court Place, Cleveland Place and Court Place, Cleveland Place and Cheyenne street, Grant avenue and Wasoola street, Wasoola and Parkinson streets, Parkinson and Cheyenne streets, city limits and Gray street, Gray and Bert streets, Bert and Mary streets, Fifteenth and Sixteenth streets, Sixteenth and Seventeenth streets, Seventeenth and Eighteenth streets, Eighteenth and Nineteenth streets, Goss and Arlington streets, Arlington and Witter streets, Witter street and Clear Creek avenue, Nineteenth street and Fair-

view avenue, Clear Creek and Bell avenues, Bell avenue and Palmer street, Palmer and Clinton streets, Clinton and Justina streets, Justina and Merrill streets, Merrill and Converse streets, Converse and Edmunds streets, Everett and Argo streets, West Fourth avenue and Center street, Vintage and Maple streets, Maple and Titus streets, South Seventh and South Eighth streets, South Eighth and South Ninth streets, South Ninth and South Tenth streets, South Tenth and South Eleventh streets, South Eleventh street and Santa Fe avenue, Santa Fe avenue and Clark street, Clark and South Water streets, South Water and South Twelfth streets, South Twelfth and South Tremont streets, South Tremont and South Thirteenth streets, South Thirteenth and South Evans streets, Evans and South Fourteenth streets, South Fourteenth and South Fifteenth streets, South Fifteenth street and Broadway, Broadway and Lincoln avenue, Lincoln avenue and Sherman avenue, Sherman avenue and Grant avenue, Grant avenue and Logan avenue, Logan avenue and Pennsylvnia avenue, Pennsylvania avenue and Pearl street, Pearl street and Washington avenue, Washington avenue and Clarkson street, Clarkson and Venice streets, Venice and Alta streets, Alta and Corona streets, Corona and Hallett streets, Corsline and Inslee streets, Hallett and Corsline streets, Inslee and Hunt streets, Hunt and Franklin streets, Franklin and Gilpin streets, Gilpin and Williams streets, Williams and High streets, High and Race streets, Race and Vine streets, Vine and Gaylord streets, Gaylord and York streets, Clarkson street and Emerson avenue, Emerson avenue and Ogden street, Ogden street and Downing avenue, Downing avenue and Marion street, Marion street and Lafayette street, Lafayette street and Humboldt street, York street and Josephine avenue, Josephine avenue and Columbine street, Columbine avenue and Murdock avenue, Murdock avenue and Clayton avenue, Clayton avenue and Filmore avenue, Filmore avenue and Finley avenue, Finley avenue and Clellan avenue, Clellan avenue and Walnut street, Estes and Legge streets, Legge and Parsons streets, Parsons and Stallcup streets, Stallcup and Apple streets, Apple and Banana streets, Cherry and Damson streets, Damson and Elder streets, Elder and Fruit streets, Fruit and Grape streets, Grape and Hazel streets, Hazel and Lemon streets, Lemon and Melon streets, Melon and Orange streets, Orange and Plum streets, and in, upon, along and through all extensions of said streets, avenues, alleys and public places, is hereby granted to The Denver Water Company, its successors and assigns to such extent as the city may lawfully grant the same, subject to be terminated in the manner hereinafter in this ordinance provided.

Sec. 2. The City of Denver shall hereafter, whenever it shall be requested so to do, make a grant to such extent as it lawfully may to said The Denver Water Company, its successors and assigns, of the same rights mentioned in section one hereof, in and upon any streets hereafter laid out or extended, and will also, whenever requested, make such additional and confirmatory grants to said The Denver Water Company, its successors and assigns of the rights and privileges mentioned in section one hereof, as it may at the

time have the lawful right and power to make; all of such further additional and confirmatory grants, if made, to be subject to termination in the manner in this ordinance hereinafter specified.

Sec. 3. The Denver Water Company, its successors and assigns, shall at all times save and hold the city harmless of and from all loss, cost or damage to person or property occasioned by any
1175 negligence in the excavation of any street, lane, alley or public place within the city, made by it in the laying of any of its mains, pipes, valves or other apparatus. And whenever the said The Denver Water Company, its successors or assigns, shall open, or cause to be opened, any street, lane, alley or other public place for laying any main, pipe, valve or hydrant or other apparatus, it shall forthwith restore the same to as good condition as the same was in before any such opening, at its own expense, and in case of any failure so to do for space of twenty-four hours after the laying of such main, pipe, hydrant, valve or other apparatus shall be completed, notice shall be given to the said company so to do by the officer, for the time being, having charge of the streets in said city; and in case of default for twenty-four hours after such notice, the said street may be put in such order by the said city, but at the expense of said company.

Sec. 4. The said The Denver Water Company shall at all times furnish water from its mains, through connections to be made by parties desiring the same, to premises abutting upon streets in which it may have a pipe laid, upon application of the owners of the same, under such rules as now prevail, and such further reasonable rules as it may prescribe, and to enable such owners to obtain such supply of water, shall permit connection to be made with its mains and pipes under its direction and in such manner and subject to such conditions as it now permits the same.

Sec. 5. The rate to private consumers for water shall not be greater than now charged by the said The Denver Water Company, a schedule of which rates is hereto annexed, marked schedule A, and the said The Denver Water Company may require any consumer to furnish a meter and pay for water by meter measurement, provided, however, that at any time after five years from date the City Council may require said company to fix schedule rates for private consumers equivalent to the average rate prevailing in the cities of Chicago, St. Louis and Cincinnati for the same service.

Sec. 6. The said The Denver Water Company shall at all times furnish water to the city and to private consumers, of a quality as good and fit for private consumption as that shown by the analysis made by order of the city of Denver by Professor Joseph A. Sewall, in the month of August, 1889.

Sec. 7. The Denver Water Company hereby purchases of the city of Denver four hundred and ninety-three hydrants, now set upon its main and owned by the city of Denver, for the sum of twenty-five thousand dollars ($25,000), payable to the City Treasurer within four months after the taking effect of this ordinance. And within one year after the taking effect of this ordinance, the said The Denver Water Company shall replace all said hydrants with hydrants having

two nozzles for hose and one for steamer connection, and with not less than a six-inch barrel. And within six months after this date the City Council shall designate the location of so many additional hydrants to be set upon the present lines of main of The Denver Water Company as will bring the total number of hydrants upon the present line of main of the said company up to the number of one thousand. And within the said one year after the taking effect of this ordinance, the said The Denver Water Company shall cause to be set in the said location, hydrants of the description last aforesaid, so that the number of hydrants upon its present lines of mains shall then be one thousand in number.

Sec. 8. The said company shall at all times, until the first day of May, 1891, keep and supply the said hydrants with an abundant supply of water for fire purposes under such pressure as it now gives; and after said first of May, 1891, shall supply all of said hydrants, and any hydrants which may be ordered to be set upon additional mains, as hereinafter in this ordinance mentioned, with a pressure equivalent, taking the elevation of the surface of the ground into account, to 115 pounds at the hydrant in front of the Union depot in said city; provided, the city shall not be in default with the company upon any of its agreements; and provided further, that if, owing to the extension and growth of the city, hydrants shall be ordered upon locations where, owing to the difference in elevation, there shall be less than forty-five pounds pressure, with a pressure of 115 pounds at the hydrant in front of the Union depot, to the number of fifty or more, the said company shall put such hydrants upon a separate high service, and keep and maintain on each of said hydrants a water pressure of not less than fifty pounds.

Sec. 9. The act of God, unavoidable accident, interference of rioters or other unlawful disturbance shall excuse any default by the company in the furnishing of any water in this ordinance provided to be furnished, for the time being.

1176 Sec. 10. Until the first day of May, 1891, the said city shall pay to The Denver Water Company, its successors and assigns, semi-annually, the sum of money mentioned in said contract between the city and the company of May 9, 1874, in full for all water furnished to the said city for all purposes mentioned in said contract, until the said first day of May, 1891. And during the remainder of the period of twenty years from and after the date of the passage and approval of this ordinance, the said city shall pay to the said The Denver Water Company, its successors and assigns, for fire purposes as follows, viz.:

For the period of ten years from and after the first day of May, 1891, the sum of thirty-five dollars per hydrant per annum for all hydrants then set and in operation, and for the remaining period until the right of purchase shall accrue, as mentioned in section 11 hereof, the sum of twenty-five dollars per hydrant per annum for all hydrants then set in operation, all payments by the city to be made semi-annually on the first days of May and November in each year during the period aforesaid, at office of the City Treasurer.

Sec. 11. At the expiration of the period of twenty years from and

after the date of the passage and approval of this ordinance, in case the city shall then elect so to do, the said works may be purchased by the said city, and in case the parties cannot agree, after such election, upon the price to be paid by the city for the water works of the said company, its successors and assigns, then their fair cash value shall be determined by arbitration, by five disinterested persons, none of whom shall be residents of Denver, two of them to be chosen by the city, two by the company and the fifth by the four first chosen; and in case of failure on the part of the company to name arbitrators for the period of thirty days after the city shall have named arbitrators and notified the company so to do, the city may apply to any court having equity jurisdiction in the county in which the city of Denver shall be situated for the appointment of two persons of the qualifications aforesaid as such arbitrators, and the court may thereupon appoint two such persons who shall act with the same force and effect as if appointed by the company, and a decision of a majority of said board shall be final and binding upon both parties; and upon the payment, or tender of payment, by said city, the said company shall convey to said city all of its property, real or personal, easements, rights and privileges, and thereafter all franchises, rights and privileges which have been at any time therefore granted said company, its successors or assigns, and which it may then possess, shall cease and be at an end.

Sec. 12. At the expiration of the said period of twenty years the said city may, at its election, renew the contract hereby made by ordinance to that effect for a like period of twenty years, but at a price for hydrant rental ten per cent. less than mentioned in section 10 hereof, for the period remaining after the ten years after May 1, 1891, and for successive periods of twenty years at the price last aforesaid, as often and as long as the city may choose. This section is conditioned, however, upon the full performance by the city of the provisions of section two hereof.

Sec. 13. The said company shall at all times after the taking effect of this ordinance, whenever so ordered to do by ordinance duly passed, extend its mains upon any street upon which no main shall then be laid, and set fire hydrants thereon, for each of which the city shall pay to the said company, its successors and assigns, the price per hydrant hereinbefore mentioned. Provided, however, that no such extention shall be ordered to be made, nor, if ordered, shall the same be of any binding effect, unless a fire hydrant is ordered for every four hundred feet of extension at least, or fractional part thereof; rent for such hydrants to accrue from and after the date when the City Clerk shall be notified that the same are set and ready for use, and at the same rate per hydrant as is hereinbefore mentioned in section ten hereof. Provided, however, that no such additional hydrants ordered and set before the first day of May, 1891, shall be entitled to any rental, except from the said last mentioned date, when the same shall begin to draw rental. And provided further, that no main laid by the said The Denver Water Company after the passage and approval of this ordinance, shall be of a less diameter than six inches.

Sec. 14. The said company, its successors and assigns, shall at all times during the existence of this contract, or any renewal thereof, furnish and supply to the city water free of charge for use in the city hall and fire department houses, also for flushing sewers and gutters and for sprinkling purposes, through special hydrants to be set for that purpose, not exceeding 400 in number, at such
1177 location as the City Council may determine, such last mentioned hydrants to be set and kept in order by the said company, its successors and assigns, and the hydrants purchased from the city under this ordinance may be used for that purpose.

To prevent controversy in regard to the manner and method of using water for the above purposes, the same shall be used under rules and regulations to be adopted by the board provided in section 18 hereof.

Sec. 15. The fire hydrants provided for in this ordinance shall not be used for any other purpose than for fire purposes and testing, and the opening and closing of said hydrants shall be under the exclusive direction of the chief of the fire department and such persons as he may appoint, and the officers and agents of said company; and the opening and closing of sprinkling hydrants shall be under the direction of such officer as the city may designate; and the city shall be liable for any damage done to the said fire hydrants or said other hydrants by any officer or agent of the city. All fire hydrants and sprinkling hydrants shall be closed when not in actual necessary use, and in times of fire the sprinkling hydrants shall not be used in any place to the detriment of the service from the fire hydrants. Nor shall the city suffer or permit undue waste of water from any of said sprinkling hydrants.

Sec. 16. The right of all persons under license from the said company, desiring to excavate the streets to connect with the mains of said company, under such proper and reasonable rules as now prevail in said city, shall not be inhibited by the said city.

Sec. 17. The said company being charged with a public duty, the said city shall pass such ordinances as will prohibit all unlawful interference with its operations, pollution of its water supply, trespass upon its property and unauthorized use of hydrants.

Sec. 18. The said city and said company shall presently, and on or before the first day of January of each third year, each appoint some competent person, and they two shall choose a third person, to whom all complaints by either party against the other of any violation of the terms of this ordinance and contract, or any controversy as to the construction and meaning of the terms of this ordinance, and the framing, altering or amending rules governing the use of water for flushing sewers and gutters and sprinkling purposes, shall be referred. And the decision of a majority of said board shall be binding on both parties. In case either party shall neglect or refuse at any time to appoint any such arbitrator, and any complaint shall then be pending, the party guilty of such neglect or omission shall be deemed to admit the claim of the other; and in case the said two so chosen shall be unable for fifteen days to agree upon a third person, such third person may be appointed upon ap-

plication of either party by any court of general equity jurisdiction in the county in which the said city of Denver shall then be situated. The parties so chosen as above shall hold such positions for the period of three years, and until their successors shall be chosen and qualified.

Sec. 19. This ordinance, when the same shall be in writing accepted by The Denver Water Company, becomes a contract between the city of Denver and the said The Denver Water Company, its successors and assigns, and the same shall, as to every provision herein contained, as fully bind and inure to the benefit of the successors and assigns of the said The Denver Water Company as to the said company. And it is expressly understood that by the acceptance of this ordinance the said The Denver Water Company loses no rights in regard to the occupation of the streets, alleys and public places, or as to the rights of any other person or persons thereto which it now possesses, but the same are hereby recognized and confirmed, and are to be deemed independent of and not merged in any grant in this ordinance, elsewhere contained.

Sec. 20. All mains, pipes, valves and other apparatus now owned by said The Denver Water Company, and composing its plant, and all such mains, pipes, valves, hydrants and other apparatus as said The Denver Water Company, its successors or assigns, shall hereafter lay down or set in or upon any of the streets, alleys or other public places within said city, shall be and remain the sole and absolute property of said The Denver Water Company, its successors and assigns. And the said The Denver Water Company, its successors or assigns, shall forever be considered and entitled to be in possession thereof, except in case of purchase by said city under the terms of this ordinance, or some agreement between said city and said company, its successors or assigns, when all rights of whatsoever
1178 nature of said company, its successors or assigns, in and to the subject matter hereof shall vest in said city.

Sec. 21. While the consideration for the respective agreements of the city and the company are upon each side, the several agreements of the other, all of the several grants, contracts and agreements in this ordinance contained are to be deemed independent agreements with the same force and effect as if each section of this ordinance was contained in a separate ordinance by itself.

Sec. 22. This ordinance shall take effect and be in force from and after its passage.

WALTER J. CONWAY,
President of the Board of Aldermen.
D. C. PACKARD,
President of the Board of Supervisors.

I do hereby certify that the above bill for an ordinance, having been by the Mayor of the city of Denver returned to the City Clerk of the city of Denver without his approval, with his objections in writing thereto; that the said City Clerk presented the same to the Board of Aldermen of the City Council of said city (it being the board in which said bill originated) at the next regular meeting of

said board after the said bill with objections had been so returned, on, to wit: April 3, A. D. 1890, and that the said board at said meeting proceeded forthwith to consider the question pending on said bill, which was, "Shall the bill pass notwithstanding the objections of the Mayor thereof?" and that two-thirds of all the members elected to said Board of Aldermen voted in the affirmative.

Attest:

WALTER J. CONWAY,
President of the Board of Aldermen.

I do hereby certify that the above bill for an ordinance, having been by the Mayor of the city of Denver returned to the City Clerk of the city of Denver without his approval, and with his objections in writing thereto, and it appearing by the certificate of the President of the Board of Aldermen that the said bill was passed by that body at the next regular meeting thereof, notwithstanding the objections of the Mayor thereto, and that two-thirds of all the members elected to said board voted in the affirmative upon said question; that at the next regular meeting of the Board of Supervisors held after the said above action on said bill by the Board of Aldermen upon, to wit: The 10th day of April, A. D. 1890, the said bill with the objections of the Mayor thereto, and the said certificate of the President of the Board of Aldermen, were presented to the Board of Supervisors by the City Clerk of the city of Denver, and that the said Board of Supervisors thereupon proceeded forthwith to consider the question pending on said bill, which was, "Shall the bill pass, notwithstanding the objections of the Mayor thereof?" and that two-thirds of all the members elected to said Board of Supervisors voted in the affirmative.

D. C. PACKARD,
President of the Board of Supervisors.

Attest:
[SEAL.]

W. H. MILBURN,
City Clerk.

1179 SCHEDULE A.

Water Rates of the Denver Water Company.

1890.

Schedule of Yearly Water Rates, Payable Semi-annually, in Advance, on the First Days of May and November of Each Year at the Office of the Company.

Alcohol, each barrel manufactured	$.10
Ale cellar, from	$20.00 to 50.00
Bakery, each oven, from	10.00 to 50.00
Barber shop, first chair	10.00
Barber shop, each additional chair	3.00
Bath, private, with heating apparatus	5.00

Bath, private, without heating apparatus		3.00
Bath, in boarding or tenement houses		5.00
Bath, public, not less than		15.00
Beer, for each barrel brewed		05
Beer house, from	$20.00 to	50.00
Billiard saloon, each table		3.00
Boarding-house, per room		1.50
But no license less than		10.00
Book bindery, not less than		10.00
Brick work, per thousand		10
Brick yard, each gang of hands		20.00
Camphine, each barrel manufactured		10
Candle manufactory, from	100.00 to	1,000.00
Candy manufactory, from	15.00 to	75.00
Church, from	5.00 to	15.00
Church, Baptist for baptistry, from	5.00 to	15.00
Cigar manufactory, per hand		2.00
But no license less than		15.00
Club room, from	$30.00 to	100.00
Coffee saloon	15.00 to	30.00
Confectionery	15.00 to	75.00
Cow		1.00
Distillery, for each barrel distilled		10
Dram shop, from	$25.00 to	100.00
Dyeing and scouring, from	25.00 to	100.00
Forge		3.00

Fountain, for six months, running not more than four hours per day, viz:

Fountain, 1 opening 1/16 inch diameter	22.50
Fountain, 1 opening ⅛ inch diameter	40.00
Fountain, 1 opening 3/16 inch diameter	52.50
Fountain, 1 opening ¼ inch diameter	67.50
Fountain, 1 opening 5/15 inch diameter	82.50
Fountain, 1 opening ⅜ inch diameter	97.50
Fountain, 1 opening 7/16 inch diameter	112.50
Fountain, 1 opening ½ inch diameter	150.00

Hall, from	$5.00 to	30.00
Hat manufactory, from	30.00 to	100.00
Horse, in private stable		3.00
Hose, for private stable, not less than		5.00

1180

Hose, for livery or sale stable, not less than		50.00
Hose, for sprinkling sidewalks and washing windows, per foot run		20
Hotel, per room		1.50
Ice cream saloon, from	$15.00 to	50.00
Laboratory, from	20.00 to	200.00
Laundry, from	20.00 to	300.00

Livery stable, per stall		2.00
Malting, per bushed		01
Office, from	$5.00 to	30.00
Oyster saloon	15.00 to	30.00
Packing house	40.00 to	500.00
Photograph gallery	20.00 to	40.00
Plastering, per square yard		½
Porter cellar, from	$20.00 to	50.00
Rectifying whisky, per barrel		03

Residence occupied by one family only:

Residence, 1 to 4 rooms		5.00
Residence, 5 or 6 rooms		6.00
Residence, 7 or 8 rooms		7.00
Residence, 9 or 10 rooms		8.00
Residence, 11 or 12 rooms		9.00
Residence, 13 or 14 rooms		10.00
Residence, 15 or 16 rooms		11.00
Residence, 17 or 18 rooms		12.00
Residence, 19 or 20 rooms		13.00
Residence of 10 or more rooms used as a boarding-house, per room		1.50
Sale stable, per stall		2.00
School, for every scholar		20
Shop, from	$5.00 to	30.00
Slaughter house, from	25.00 to	500.00
Soap manufactory, from	100.00 to	1,000.00
Soda manufactory, from	40.00 to	300.00
Spirit gas, for each barrel manufactured		10
Sprinkling street, for that portion of street embraced between the two cross streets		15.00
Sprinkling street with hose, including sidewalks, per foot run		20
Starch manufactory, from	$50.00 to	200.00
Steam boilers, per square foot of fire surface, not less than.		40
But no license less than		25.00
Stock yard, from	$25.00 to	500.00
Stone work, per perch		05
Store, from	$10.00 to	300.00
Sugar refinery, from	300.00 to	3,000.00
Tannery, per vat		6.00
But no license less than		25.00
Tenement, per room		1.50
But no license less than		10.00
Tobacco manufactory, per hand		2.00
But no license less than		15.00
Urinal basin, from	$10.00 to	40.00
Vault, for residence		5.00
Vault, accommodating double house, each house		3.00

Vault, for tenement or boarding-house, for every 15 rooms.		5.00
Vault, bar		5.00
Vehicle		2.00
Vinegar, for each barrel manufactured		05
Washing bottles, from	$5.00 to	20.00
Washing barrels, per barrel		05
Washing meat, from	$50.00 to	500.00
Water closet, private		5.00
Water closet, hotel		10.00
Wine cellar, from	$20.00 to	50.00
Restaurant, from	25.00 to	100.00

Special rates adopted by this company:

Irrigation of lots only through hose with nozzle, 40c. per front foot.

No license for irrigation will be issued for less than the season rate.

Water for irrigation must not be used except within the hours specified on the license, nor during a fire or conflagration. Any violation of this rule will subject the license to forfeiture.

For fountain in drug store, six months, opening not to exceed ⅛ inch in diameter	$50.00
For tumbler-washer in drug store, six months	50.00

Water used for elevators, motors or manufacturing purposes at the following rates, payable monthly:

When the quantity used per day is from 1,000 to 5,000 gallons, per 1,000 gallons	$.20
5,000 to 25,000 gallons per day, per 1,000 gallons	15
Provided that the rate for any month shall not be less than.	6.00

Where water is paid for all purposes on premises, there will be no additional charge for a stand-pipe for fire protection. Where The Denver Water Company's water is not used, a special rate will be made for such stand-pipes.

The water company reserves the right to require any customer to furnish a meter and pay for water by meter measurement. In any case before a meter is placed, a satisfactory rate must be established or agreed upon.

(Endorsed:) 6274. U. S. District Court, District of Colorado. Plaintiff's Exhibit A-3. Filed Oct. 6, 1915. Charles W. Bishop, Clerk.

(Here follows map marked page 1182.)

MAPS

TOO

LARGE

FOR

FILMING

COMPLAINANT'S EXHIBIT No. A-7.

Case No. —.

The Denver Union Water Company.

L. M.

July 3, 1914.

G. G. A.

Real Estate.

Comparative Table of Values Submitted.

	Acres.	McNeill and Sanborn.	Wall and Bowles.	Board of Appraisal; Mar. 4. 1909.	Metcalf and Anderson.
		On basis of ranch lands.			
Lake Cheesman	8,435.96	.....	.....	$200,000	$200,000
Platte Canon, Inlet	152.624	$765	$765	3,600	3,600
Platte Canon, Part of Sedimentation Basin	306.65	2,760	3,065	7,500	7,500
Platte Canon Reservoir Site	112.968	*a*	7,545	9,000	9,000
Platte Canon Filter Site	47.57	1,733	1,415	7,850	7,850
Lehow Lake	13.08	500	520	2,500	2,500
Phœbe Strong Rch	680.00	14,250	18,080	17,060	18,080
Wm. Strong Ranch	280.00	13,225	15,800	16,125	15,800
Becky Archer Rch	160.00	11,500	13,100	13,750	13,100
Frank Archer "	587.60	31,850	37,900	37,850	37,900

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	Acres.	McNeill and Sanborn.	Wall and Bowles.	Board of Appraisal; Mar. 4, 1909.	Metcalf and Anderson.
		On basis of ranch lands.			
Mountain Reservoir Site	810.00	4,860	6,075	4,860	6,075
Land at Harriman Ditch Headgates	11.84	300	1,000	1,500	1,500
Harriman Ditch Fencing	.....	50	50	50	50
Harriman Reserv'r	130.00	*b*	8,450	.....	8,450
Marston Lake Flume	7.58	200*c*	1,137	1,500	1,137
Marston Lake Reservoir Site	840.224	*d*	71,780	168,000	168,000
Sullivan Reservoir Site	80.00	1,000	2,000	5,000	2,000
Cherry Creek Gallery Lands	147.04	4,100	4,370	8,500	8,500
Woodbury Land, Loretto Heights	20.00	.....	1,500	.....	1,500
Lands on Conduits, Rights of Way	124.472	.....	22,028	20,500	22,028
Lands on Conduits, Easements, where fee not owned (58 miles)	.....	6,000	17,400	3,500	17,400

a—Valued only 54.7 acres at $820.
b—Harriman Ranch 812.8 acres valued at $23,478.
c—Valued only 150 acres outside water surface at $4,250.
d—Only 3.03 acres valued.

(Endorsed:) 6274. U. S. District Court, District of Colorado. Plaintiff's Exhibit A-7. Filed Oct. 6, 1915. Charles W. Bishop, Clerk.

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1184 COMPLAINANT'S EXHIBIT No. A-8.

Case No. —.

July 10, 1914.

The Denver Union Water Company.

Outside Denver.

Real Estate.

	Acres.	Values.
Lake Cheesman	8,435.96	$200,000
Platte Canon—Inlet	152.624	3,600
" " —Part of Sedimentation Basin	306.65	7,500
Platte Canon Reservoir Site	112.968	9,000
Platte Canon Filter Site	47.57	7,850
Lehow Lake	13.08	2,500
Phœbe Strong Ranch	680.00	18,080
William Strong Ranch	280.00	15,800
Becky Archer Ranch	160.00	13,100
Frank Archer Ranch	587.60	37,900
Mountain Reservoir Site	810.00	6,075
Land at Harriman Ditch Headgates	11.84	1,500
Harriman Ditch Fencing	.....	50
Harriman Reservoir	130.00	8,450
Marston Lake Flume	7.58	1,137
Marston Lake Reservoir Site	840.224	168,000
Sullivan Reservoir Site	80.00	2,000
Cherry Creek Gallery Lands	147.04	8,500
Woodbury Land—Loretto Heights	20.0	1,500
Lands on Conduits—Rights of Way	124.472	22,028
Easements where fee not owned, 58 miles	.....	17,400
		$551,970

Add for Legal, Engineering Expenses and Contingencies:

On $200,000—....	
On 351,970—10%	35,197
	$587,167

(Endorsed:) 6274. U. S. District Court, District of Colorado. Plaintiff's Exhibit A-8. Filed Oct. 6, 1915. Charles W. Bishop, Clerk.

METCALF'S EXHIBIT A-9.

Case No. —.

COMPLAINANT'S EXHIBIT No. A-9.

The Denver Union Water Company.

July 10, 1914.

City property.	Acres.	Lots.	Newcomb.	Conaway.	Watson.	Average.
Item 18. Littleton Mill, land only	....	....	.....	.....	$4,450	$4,450
Item 21. Ashland Ave. Reservoir site	8.37	....	$5,859	5,022	6,696	5,859
Item 22. Ashland Ave. Pumping Station	....	11	1,375	1,500	1,650	1,508
Item 23. De Lappe Place Pumping Station	....	3 1/5	750	640	640	676
Item 24. Cottage Hill Tank	....	43	6,450	6,450	7,525	6,808
Item 25. West Denver Pumping Station	10.46	....	52,300	47,070	52,300	50,557
West Denver Pumping Station	....	3	1,500	1,500	1,500	1,500
Item 26. West Denver Tail Race	5.39	....	11,982	9,432.50	10,780	10,731
Item 27. Lake Archer Canal & Lands	....	....	209,239	221,625	194,055	208,306
Item 28. University Park Tank Site	....	4	100	300	300	233
Item 29. University Park Pumping Station	....	14	700	1,050	1,500	1,083
Item 30. Littleton Heights	....	....	.....	.....	3,250	3,250
Item 31. Highland	....	2	500	500	600	533

THIS PAGE
VERTICAL

BOUND BOOK

Item 32. Cottage Hill	46	6,900	6,900	6,625	6,808
Item 33. Lots 11 to 20 and 27 to 40	24	300	350	450	367
		$297,955*	$302,339*	$292,321	$302,669
Add 10 per cent for Legal, Engineering & Contingencies					30,267
					$332,936

* Note omission of two items.

Property in City	$332,936
Property outside of City	587,167
	$920,103

(Endorsed:) 6274. U. S. District Court, District of Colorado. Plaintiff's Exhibit A-9. Filed Oct. 6, 1915. Charles W. Bishop, Clerk.

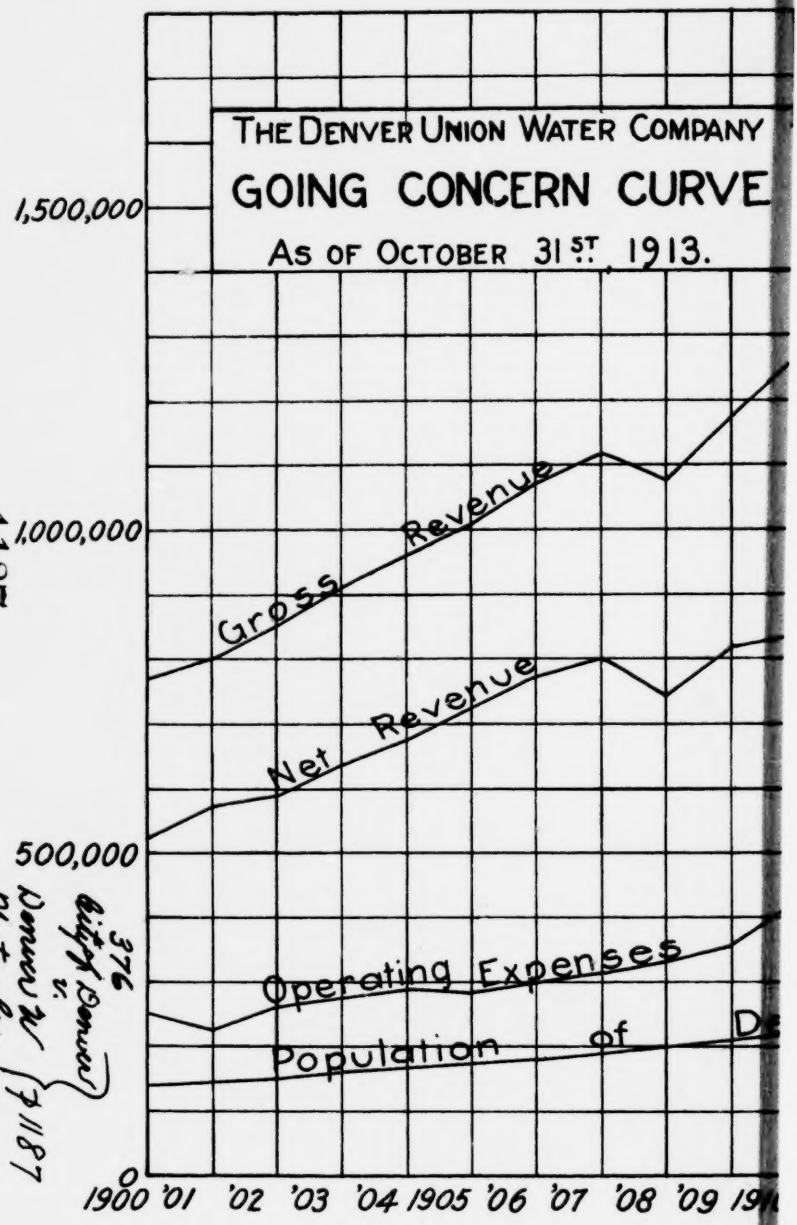
1186 METCALF EXHIBIT No. 1.

July 1, 1914.

The Denver Union Water Company.

Development Expense or Going Concern Value Based upon Different Assumptions.

1. Development expense on basis Public Utilities Engineer's assumptions corrected to follow Wisconsin Railroad Commission theory with 7% assumed fair rate of return and 1% depreciation allowance (Excluding allowance for new construction paid for in any other manner than by the proceeds from bond issues....	$1,710,000.00
2. Development expense upon revised revenue and operation figures and Public Utilities Engineer's assumptions upon Wisconsin Railroad theory with 7% fair rate of return and 1% annual depreciation allowance (Excluding construction costs other than those covered by proceeds of bond issues)	1,920,000.00
3. Development expense on basis of book account of new construction after the consolidation of the Companies in 1904 and an assumed construction account at that time of $7,000,000.00 upon Wisconsin Railroad Commission theory with 7% assumed fair rate of return and 1% depreciation allowance	$5,778,000
4. Development expense on basis number three, but with 6% fair rate of return and 1% depreciation allowance	$1,721,000
5. Going Concern value by comparative method based upon present revenue under leaflet Schedule and assumptions as to acquisition of revenue by comparative plant believed to be unduly favorable to the City rather than in accord with conservative interpretation of the Company's actual position	990,000.00
6. Going Concern value on basis similar to number five except that instead of the actual revenue under the Leaflet Schedule, the revenue is assumed at 6% fair return upon an assumed fair value of the property of $15,500,000 (Which involves an approximate increase in revenue for the year 1915 of $152,000.00)	1,630,000.00
7. Going Concern value by the comparative method under conditions similar to number six, except that the fair rate of return is assumed to be	



1187

376 Bijou Denver v. Denver & Water Co. F 1187

ION WATER COMPANY
NCERN CURVE
BER 31 ST. 1913.
enue
nue
Expenses
on of Denver
Date of Valuation October 31st 1913.
Gross Revenue
Net Revenue
Operating Expenses
End of Assumed Construction Period of New Plant
New Plant
New Plant
New Plant
End of Development Period of New Plant
1,500,000
1,000,000
500,000
0
'06 '07 '08 '09 1910 '11 '12 '13 '14 1915 '16 '17 '18 '19 1920 '21
METCALF EXHIBIT No 2

Going Concern Value Computatio, a

Revenue and Operating Expenses of E

The Denver Union Wter

	Existing plant.					
Year end. ing Oct. 31.	Gross revenue.	Operation, maintenance and taxes.	Net revenue, exclusive of depreciation and fixed charges.	Annual depreciation allowance.	Net revenue, applicable to fixed charges & dividends.	G re
(1)	(2)	(3)	(4)	(5)	(6)	(
1913 Date of Valuation.						
1914...	1,437,500	$500,000	$937,500	$136,000	$801,500	
1915...	1,483,500	451,500	1,032,000	136,000	896,000	$25
1916...	1,529,500	465,500	1,064,000	136,000	928,000	62
1917...	1,575,000	480,000	1,096,000	136,000	960,000	1,00
1918...	1,616,000	492,000	1,124,000	136,000	988,000	1,31
1919...	1,656,000	504,000	1,152,000	136,000	1,916,900	1,51
1920...	1,696,000	516,000	1,180,000	136,000	1,044,000	1,65
1921...	1,786,000	528,000	1,208,000	136,000	1,072,000	1,73

Annual Depreciation 1913.....	$77,060
4% Sinking Fund on $1,478,431 =.....	59,137
	$136,197

IT No. 5.

on, as of October 31, 1913.

of Existing and New Plant.

ater Company.

	New plant.				
oss nue.	Operation, maintenance, and taxes.	Depreciation. Sum upon which it is based	Depreciation. Amount at 1%.	Net revenue, applicable to fixed charges & dividends.	Excess of net revenue of existing over new plant, col. (6–11).
)	(8)	(9)	(10)	(11)	(12)
....	$100,000	.....	.....	$100,000	$901,500
,000	225,000	.....	.....	25,000	871,000
,000	315,000	$2,541,000	$25,000	285,000	643,000
,000	385,000	4,552,000	45,000	570,000	390,000
,000	440,000	7,392,000	74,000	796,000	192,000
,000	475,000	Complete	136,000	904,000	112,000
,000	505,000	"	136,000	1,014,000	30,000
,000	528,000	"	136,000	1,072,000	.....
Note this should be					77,896
1% on $1,514,544 =					60,582
					$138,478

Assumed Capital in Hands of Investor B
Value of Physica
Interest during Co

Assumed Going Co

Year ending Oct. 31.	Total investment to date in new plant, incl. interest during construction.	Going concern value.	Determination of interest on unemployed capital: Total assumed investment to date column (2+3).	Amount unemployed & invested which is earning 4% interest.	Amount withdrawn for construction during year & going concern.	O
(1)	(2)	(3)	(4)	(5)	(6)	
1913	Date of Valuation.					
1914	$5,450,000	.....	$5,450,000	$10,400,000	$5,450,000	$
1915	7,900,000	$322,000	8,222,000	7,628,000	2,772,000	
1916	10,400,000	623,000	11,023,000	4,827,000	2,801,000	
1917	12,890,000	809,000	13,699,000	2,151,000	2,676,000	
1918	14,863,439	870,000	15,733,439	116,561	2,034,439	
1919	.....	883,000	15,746,439	103,561	13,000	
1920	.....	959,000	15,822,439	27,561	76,000	
1921	.....	978,000	15,841,439	8,561	19,000	

It is to be noted that all of the assumptions with regard to rapidi
All things considered and giving some regard to the developement exper
$915,761 less Depreciation ($78,000 + $58,000 on accrued sinking fund

Development Expense on Basis—
Leonard Metcalf's Revised

Book New Construction Account
" "

METCALF EXHIBIT No. 6.

The Denver Union Water Company.

Feb. 7, 1914.

Going Value Computation.

IT N

r Builder on Oct. 31, 1913:

on, ical Plant including Water Rights	$14,023,925
Construction 8% Excl. Water Rights	839,514
	$14,863,439
ater Concern Value	986,561
	$15,850,000

ital of new plant.

One year's interest at—		Total interest upon unemployed capital.	New plant interest during construction, allowed in capital account.	Total deductions from excess net revenue of existing plant over new plant column (9+10).	Preliminary excess net revenue of existing over new plant, see table.	Final excess net revenue of existing over new plant, col. (12—11).	Present worth of excess net revenue of existing over new plant.			
Column 5 at 4%.	Half of column 6, 2%.						Period in years.	Factor at 6%.	Amount.	Cumulative amount.
(7)	(8)	(9)	(10)	(11)	(12)	(13)				
$416,000	$54,500	$470,500	$90,000	$560,500	$901,500	$341,000	1	0.9434	$322,000	$322,000
305,120	27,720	332,840	200,000	532,840	871,000	338,160	2	0.8900	301,000	623,000
193,080	28,010	221,090	200,000	421,090	643,000	221,910	3	0.8396	186,000	809,000
86,040	26,760	112,800	200,000	312,800	390,000	77,200	4	0.7921	61,000	870,000
4,662	20,344	25,006	149,514	174,520	192,000	17,480	5	0.7473	13,000	883,000
4,142	130	4.272	.....	4,272	112,000	107,728	6	0.7050	76,000	959,000
1,101	760	1,861	.....	1,861	30,000	28,139	7	0.6651	19,000	978,000
342	190	532	.....	532	.....	532	8			

Probably Going Value..... $980,000

dity of acquisition of revenue by the comparative (new) plant are generous to it, and are not fairly conservative as they should be. pense computations which gave the results shown below, and bearing in mind the 1913 Gross Revenue $1,385,973, and net Revenue nd = $136,000). I think that a fair value for Going Concern would be $1,200,000.

—Utilities Engineer's Assumptions & Wisconsin R. R. Com..... 7%+1%=$1,710,359
" " " " " " ..... 7%+1%= 1,920,418

t & " " " ..... 7%+1%= 5,844,232
" " " ..... 6%+1%= 1,775,968

Date.	Lands & rights of way.	Water rights. Note.—Interest during construction already included therein under method of figuring adopted.
	$860,113	
	66,011	
	$926,124	
E. C. & L., Oct. 31	.....	$3,530,000
	Excl. Int. during Constr.	
(1)	(2)	(3)
1913	Date of Valuation.	
.....	$926,124	(3,530,000)
1914	.....	.....
.....	.....	.....
1915	.....	.....
.....	.....	.....
1916	.....	.....
.....	.....	.....
1917	.....	.....
.....	.....	.....
1918	.....	.....
Totals	$926,124	$3,530,000

Consumption (1913) Average 45.7 M. G. D. = 106,000 G. P. D. per mi

429 miles 21,000 = 20%.

127,000

Say 125,000 G. P. D. per mi

Oct. 1914 29 miles pipe.
125,000

3.6 M. G. D. mean.

1915 129 miles = 16.2 M. G. D.
1916 229 miles = 28.6 M. G. D.
1917 329 miles = 41.1 M. G. D.
1918 429 miles = 53.6 M. G. D.

METCALF EXHIBIT No. 7.

Interest During Construction & Progressive Amount of Investment.

The Denver Union Water Company.

ghts. nter- ng tion in- erein thod ng d.	Infiltration galleries.	Reservoirs & sources of supply.	Conduits.	Filters.	Pumping stations & bldgs. & implements.	Distribution pipe.	Miscellaneous.	Total net physical value, exclusive of going concern value & interest during construction.		Average amount upon which interest chargeable for 1 full year on capital account (water rights excluded) as to d. constr. is included. in item
								During year.	To date.	
000	$87,725 Excl. Int. during Constr.	$2,040,265 Excl. Int.	$1,976,649 Excl. Int.	$347,899 Excl. Int.	$446,782 Excl. Int.	$4,259,421 Excl. Int.	$409,060 Excl. Int. during Constr.			
	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
000)	$37,725	$220,000	$150,000	.....	$160,000	(29 mi.) $325,000	.....	$1,818,849	.....	.....
...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
...	50,000	340,000	600,000	Willard. $40,000	100,000	1,120,000	.....	.....	.....	.....
...	.....	.....	.....	.....	.....	.....	.....	2,250,000	$1,818,849	$1,250,00
...	.....	500,000	600,000	Marston. 30,000	50,000	1,120,000	.....	.....	.....	.....
...	.....	.....	.....	.....	.....	.....	.....	2,300,000	4,068,849	2,820,00
...	.....	500,000	400,000	170,000	100,000	1,120,000	.....	.....	.....	.....
...	.....	.....	.....	.....	.....	.....	.....	2,290,000	6,368,849	2,680,00
...	.....	480,265	226,649	107,899	36,782	574,421	409,060	.....	.....	.....
...	.....	.....	.....	.....	.....	.....	.....	1,835,076	8,658,849	2,960,00
000	$87,725	$2,040,265	$1,976,649	$347,899	$446,782	$4,259,421	$409,060	.....	.....	.....
								$10,493,925	$14,023,925	2,180,00
per mile							Add Water Rights	3,530,000		.....
							Total (Excl. Interest during Constr. & Going Value)	14,023,925		
per mile										

EXHIBIT No. 7.

Progressive Amount of Investment.

ion Water Company.

Distribution pipe.	Miscellaneous.	Total net physical value, exclusive of going concern value & interest during construction.		Average amount upon which int. is chargeable for 1 full year to capital account (water rights excluded) as int. d. constr. is incld. in item.	Interest at 7% upon amounts shown in previous column.	Final assumption 8% interest during construction.	Revised net investment in plant (excluding going concern), but including water rights & interest during construction.	
		During year.	To date.				During year.	To date.
$4,259,421 Excl. Int.	$409,060 Excl. Int. during Constr.							
(9) (29 mi.)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
$325,000	.....	$1,818,849	.....	.....	.....	.....	$3,530,000	.....
.....	.....	.....	.....	.....	.....	.....	1,908,849	.....
1,120,000	.....	2,250,000	$1,818,849	$1,250,000	$87,500	$90,000	5,438,849	Say. $5,450,000
1,120,000	.....	2,300,000	4,068,849	2,820,000	197,400	200,000	2,450,000	7,900,000
1,120,000	.....	2,290,000	6,368,849	2,680,000	187,600	200,000	2,500,000	10,400,000
574,421	409,060	1,835,076	8,658,849	2,960,000	207,200	200,000	2,490,000	12,890,000
.....	.....	.....	.....	2,180,000	152,600	149,514	1,984,590	14,863,439
$4,259,421	$409,060	$10,493,925	$14,023,925	.....	$832,300	$839,514	$14,863,439	$14,863,439
	Add Water Rights	3,530,000			Equiv. 7.93% Say 8%.			
Interest during Constr. & Going Value)		14,023,925						

7% upon an assumed fair value of the property of $15,500,000.00 (involving an increase in revenue during the year 1913 of approximately $307,000	2,080,000.00
8. Going Concern value on basis of 10% of net reproduction cost	1,600,000.00
9. Going Concern value upon basis of one year's gross revenue (based upon Leaflet Schedule) (Under Eastern conditions these ratios would be somewhat exceeded)	1,386,000.00
10. Development expense or going concern value assumed by Metcalf and Anderson based upon above findings and the consideration of the actual conditions under which this Company is now operating	1,200,000.00

Case No. —.

Complainant's Exhibit No. A-19. H. B. O.

(Here follows diagram marked p. 1187.)

(Here follow Tabular Statements, marked pages 1188-1192.)

METCALF EXHIBIT No. —.

Table 1, Development Expense.

Denver Union Water Company.

Oct. 31, 1913.

Figured upon Basis Assumed by Public Utilities Engineers.

Corrected to Accord with Method Used by Wisconsin Railroad Commission.

Year.	Bonds outstanding.	Assumed capital sum equal to bonds outstanding + revenue deficit or — revenue excess.	Net revenue.	Estimated fair return. Interest..... 7% Depreciation.. 1% Total..... 8%	Revenue deficit.
1895.....	$7,000,000	.....	$454,450	$560,000	$105,550
1896.....	7,000,000	$7,105,550	409,737	568,444	158,707
1897.....	7,000,000	7,264,257	400,875	581,141	180,266
1898.....	7,000,000	7,444,523	499,699	595,562	95,863
1899.....	7,000,000	7,540,386	511,547	603,231	91,684
1900.....	7,000,000	7,632,070	520,349	610,566	90,217
1901.....	7,500,000	8,222,287	595,212	657,783	62,571
1902.....	7,750,000	8,534,858	625,165	682,789	57,624
1903.....	8,000,000	8,842,482	664,242	707,398	43,156
1904.....	8,000,000	8,885,638	665,530	710,851	45,321

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1905	9,000,000	9,930,959	730,208	794,477	64,269
1906	9,250,000	10,245,228	781,916	819,618	37,702
1907	9,750,000	10,782,930	791,589	862,634	71,045
1908	10,400,000	11,503,975	749,150	920,318	171,168
1909	10,400,000	11,675,143	824,151	934,011	109,860
1910	10,559,000	11,944,003	837,111†	955,520	118,409
1911	10,846,000	12,349,412	901,076	987,953	86,877
1912	11,000,000	12,590,289	952,365	1,007,223	54,858
1913	11,120,000*	12,765,147	956,000	1,021,212	65,212
Totals		$12,830,359	$12,870,372	$14 580,731	$1,710,359
Deduct Bonds		— 11,120,000			
Development Expense		$1,710,359			

*This amount should have been $11,112,000 but the Utilities Commission Engineers' figures have been followed here.

†This amount excludes allowance for the legal and other expenses incident to the franchise litigation in 1910.

This computation excludes allowance for new construction paid by any and all other means than by proceeds of sale of bonds.

METCALF EXHIBIT No. —.

Table 2, Development Expense.

Denver Union Water Company.

Oct. 31, 1913.

Figured upon Metcalf's Revised. Net Revenue Figures, Bonds Outstanding, and 7% Return. Both the Latter Assumed by the Utilities Engineers.

Year.	Bonds outstanding.	Assumed capital sum = bonds outstanding + revenue deficit or — revenue excess.	Net revenue.	Estimated fair return. Interest..... 7% Depreciation.. 1% Total..... 8%	Revenue deficit.
1895.....	$7,000,000	.....	$468,066	$560,000	$91,934
1896.....	7,000,000	$7,091,934	409,738	567,355	157,617
1897.....	7,000,000	7,249,531	400,875	579,964	179,089
1898.....	7,000,000	7,428,640	499,699	594,291	94,592
1899.....	7,000,000	7,523,232	511,457	601,859	90,402
1900.....	7,000,000	7,613,640	521,780	609,091	87,311
1901.....	7,500,000	8,200,945	572,190	656,076	83,886
1902.....	7,750,000	8,534,831	590,499	682,786	92,287
1903.....	8,000,000	8,877,118	638,210	710,169	71,959
1904.....	8,000,000	8,949,078	675,825	715,926	40,101

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1905	9,000,000	9,989,178	724,511	799,134	74,623
1906	9,250,000	10,313,802	772,904	825,104	52,200
1907	9,750,000	10,866,002	802,082	869,280	67,198
1908	10,400,000	11,583,200	742,910	926,656	183,746
1909	10,400,000	11,766,946	818,147	941,356	123,209
1910	10,559,000	12,049,155	834,234*	963,932	129,698
1911	10,846,000	12,465,853	895,314	997,268	101,954
1912	11,000,000	12,721,807	936,571	1,017,745	81,174
1913	11,112,000†	12,914,981	915,761	1,033,199	117,438
Total		13,032,418	$12,730,773	$14,651,191	$1,920,418
Deduct Bonds		—11,112,000			
Development Expense		$1,920,418			

†This amount was erroneously shown as $11,120,000 in the Utilities Engineers' report.
*This excludes allowance for the legal and other expenses incident to the franchise litigation in 1910.

Table 3, Development Expense.

The Denver Union Water Company.

July 2, 1914.

Based upon 7,000,000 Bond Issue in 1894, Plus Annual New Construction Shown upon Books of The Denver Union Water Company, Aggregating a Total Amount of $13,724,487.00.

Year ending Oct. 31.	Annual construction cost.	Account to date.	Capital account being construction account plus deficit, or minus excess in earnings.	Net revenue.	Estimated return. Int..... 7% Depr..... 1% Total.. 8%	Revenue deficit.
Prior to Consolidation of Companies	$7,000,000*	$7,000,000	.....	.....	.....	.....
1895.....	192,649	7,192,649	$7,192,649	$468,066	$575,412	$107,346
1896.....	30,904	7,223,553	7,330,899	409,738	586,472	176,734
1897.....	96,290	7,319,843	7,603,923	400,875	608,314	207,439
1898.....	69,744	7,389,587	7,881,106	499,699	630,488	130,789
1899.....	428,907	7,818,494	8,440,802	511,457	675,264	163,807
1900.....	243,166	8,061,660	8,847,775	521,780	707,822	186,042
1901.....	623,564	8,685,224	9,657,381	572,190	772,590	200,400
1902.....	694,231	9,379,455	10,552,012	590,499	844,161	253,662
1903.....	521,433	9,900,888	11,327,107	638,210	906,169	267,959
1904.....	383,874	10,284,762	11,978,940	675,825	958,315	282,490
1905.....	321,381	10,606,143	12,582,811	724,511	1,006,625	282,114
1906.....	359,261	10,965,404	13,224,186	772,904	1,057,935	285,031
1907.....	495,889	11,461,293	14,005,106	802,082	1,120,408	318,326

1908.....	416,004	11,877,297	14,739,436	742,910	1,179,155	436,245
1909.....	122,018	11,999,315	15,297,699	818,147	1,223,816	405,669
1910.....	544,417	12,543,732	16,247,785	834,234	1,299,823	465,589
1911.....	609,299	13,153,031	17,322,673	895,314	1,385,814	490,500
1912.....	409,599	13,562,630	18,222,772	936,571	1,457,822	521,251
1913.....	161,857	13,724,487	18,905,880	915,761	1,512,470	596,709
Total....	$13,724,487		$19,502,589	$12,730,773	$18,508,875	$5,778,102
Deduct Construction Account.....			$13,724,487			
Development Expense			$5,778,102			

*Amount of Bond Issue arbitrarily assumed. No value assumed upon the stock outstanding in 1894, in this computation.

Taken out of revenues Int. on bonds 3 dividends $6,724,487 construction.

(Endorsed:) 6274. U. S. District Court, district of Colorado, Plaintiff's Exhibit A-19. Filed Oct. 6, 1915. Charles W. Bishop, Clerk.

METCALF EXHIBIT A-26.

COMPLAINANT'S EXHIBIT No. A-26 H. B. O.

Case No. —. June 30, 1914.

Comparison of Valuations of the Property of the Denver Union Water Company by Different Engineers and Boards.

	Board of Appraisal, March 4, 1909.	John R. Freeman, 1914.	M. L. Holman, 1914.	Allen Hazen, 1914.	Public Utilities Engineers, Oct. 31, 1913.	Leonard Metcalf and Geo. S. Anderson, Oct. 31, 1913.	Metcalf & Anderson, June, '14.
Structures including interest during construction..	$9,447,683	.....	.....	.....	$9,172,374	$10,388,276	.....
Real Estate....	906,392	.....	.....	.....	496,776	920,103	.....
Plant	$10,354,075	.....	$11,547,884	.....	$9,669,150	$11,308,379	.....
Going value or Development Exp.	1,100,000	.....	1,154,788	.....	375,628	.....	.....
Business	100,000	.....	.....	.....	Omitted	.....	.....
	$11,554,075	.....	$12,702,672	.....	$10,044,778	$12,508,379	.....
Water Rights..	2,845,925	.....	3,556,406	.....	Omitted	3,530,000	.....
Total	$14,400,000	$15,370,000	$16,259,078 or $16,614,719	$15,300,000	Incomplete	$16,038,379	$16,000,000

(Endorsed:) 6274. U. S. District Court, District of Colorado. Plaintiff's Exhibit A-26. Filed Oct. 6, 1915. Charles W. Bishop, Clerk.

COMPLAINANT'S EXHIBIT No. A-27.

Case No. —.

Stream Discharge of South Platte River at Platte Canon During the Irrigation Season—From April to October, Inclusive.

	'87	'88	'89	'90	'91	'92	'96	'97	'99	1900	'01	'02	'03	'04
Apr.	....	297	172	....	142	....	473	370	454	826	419	261	144	136
May	....	573	478	391	1117	630	502	984	760	2376	749	181	212	470
June	....	550	460	403	1243	628	281	1046	1346	1671	738	128	859	541
Jul-	541	311	324	520	645	847	233	....	1161	491	300	85	353	421
Aug.	546	264	211	562	373	535	189	....	587	231	479	81	216	633
Sept.	404	179	129	196	219	328	250	....	233	173	232	82	211	366
Oct.	303	184	118	172	....	392	217	....	172	170	126	107	114	301

	'05	'06	'07	'08	'09	'10	'11	'12	'13
Apr.	563	468	299	173	156	415	188	104	389
May	1321	887	637	191	424	602	361	470	569
Jun-	1226	722	1200	255	1032	464	492	1307	930
Jul-	345	515	1195	276	925	312	864	1253	775
Aug.	285	350	708	391	886	404	373	740	542
Sept.	253	477	355	236	1704	171	242	386	423
Oct.	167	492	230	175	607	167	144	249	324

The records for 1900 and 1901 are from the measurements at the dam of the Northern Colorado Irrigation Canal.

All others are from the records of the State Engineer.

From 1900 on, these records show only the quantity of water passing Platte Canon, not accounting for any storage in Lake Chessman.

(Endorsed:) 6274. U. S. District Court, District of Colorado. Plaintiff's Exhibit A-27. Filed Oct. 6, 1915. Charles W. Bishop, Clerk.

COMPLAINANT'S EXHIBIT No. A-28.

Case No. —.

Discharge of South Platte River at Platte Canon During Non-irrigation Months of January, February, March, November, December. In Cubic Feet Per Second.

	1887	'88	'89	'90	'91	'93	'94	'95	'96	'97	'98	'99	1900	'01	'02
Jan.	....	....	....	....	....	....	....	....	97	81	211	....	98	....	70
Feb.	....	....	....	....	....	....	....	....	115	80	172	....	53	....	....
Mar.	....	....	....	....	....	....	....	....	207	101	178	....	156	....	....
Nov.	....	....	....	....	....	....	....	241	169	....	123	160	....	50*a*	74
Dec.	....	....	....	....	....	....	....	145	93	....	....	160	....	....	55

	1903	'04	'05	'06	'07	'08	'09	1910	'11	'12	'13
Jan.	34	28	56	44	141	63	67	148	60	47	81
Feb.	33	44	67	56	160	63	64	107	50	48	72
Mar.	101	96	218	134	228	154	110	550	152	94	97
Nov.	117	171	153	419	144	118	379	175	95	244	222
Dec.	49	76	62	187	82	71	168	65	29	101	179

a—11 days only.

Up to and including 1900 from "Water Resources of Colorado", Bulletin No. 74 U. S. G. S.—A. L. Fellows.

From April 1902 to 1908, inclusive, from observations by Denver Union Water Company at Platte Canon. Corrected by relation with storage at Lake Cheesman.

Dec. 1912 and all 1913, do. do.

1901 and Jan. 1902 and from 1909 to 1912, inclusive, from State Engineers' records of flow at South Platte. (To be considered for the continuous supply of 56 cubic feet per second.) That shows the following percentages:

January	93.08	per cent
February	93.81	" "
March	100.00	" "
November	99.39	" "
December	95.72	" "
Average	96.40	per cent.

(Endorsed:) 6274. U. S. District Court, District of Colorado. Plaintiff's Exhibit A-28. Filed Oct. 6, 1915. Charles W. Bishop, Clerk.

COMPLAINANT'S EXHIBIT No. A-31.

Case No. —.

Appendix A.

1899—79,064 acre feet stored—less evaporation 2654 ac. ft.
1900—79,064 " " " " " .... " "
1901—66,182 " " " " " 2,654 acre feet
1902—10,962 " " " " " 500 " "
1903—16,108 " " " " " 600 " "
1904—37,968 " " " " " 1,000 " "
1905—79,064 " " " " " 2,214 " "
1906—78,282 " " " " " 2,300 " "
1907—79,064 " " " " " 3,075 " "
1908—14,112 " " " " " 500 " "
1909—79,064 " " " " " 2,654 " "
1910—50,000 " " " " " 2,585 " "
1911—29,544 " " " " " 875 " "
1912—79,064 " " " " " 2,208 " "
1913—79,064 " " " " " .... " "
1914—79,064 " " " " " .... " "

	Acre feet.
	76,410
	79,064
	63,528
	10,462
	15,508
	36,968
	76,850
	75,982
	75,989
	13,612
	76,410
	47,415
	29,069
	76,856
	79,064
	79,064
Total Storage	912,251
Average Storage	57,016

(Endorsed:) 6274. U. S. District Court, District of Colorado. Plaintiff's Exhibit A-31. Filed Oct. 6, 1915. Charles W. Bishop, Clerk.

(Here follow fac-similes of water rent notices, marked pages 1200-1213.)

No_____

Denver, Colo. 18?_

Block Lots

Premises

Name

$____

Attachm

Water Rates Pa

To Water Re

On .....

" .....

" .....

" .....

Daily Tribune Steam Print

In consideratio

Company and the

the undersigned,

introduced by said

Attachment No. 467

NOTICE.—The Water will be turned off all premises for which the Water Rates are not paid promptly, in advance.

Denver Colorado Nov. 1 187 4

To DENVER CITY WATER CO., Dr.,

Water Rates Payable Semi-Annually in Advance.

OFFICE: ~~Larimer Street.~~ 352 Lawrence Street.

		SEMI-ANNUAL RATE.	
To **Water Rent,** from this date to	May 1 187 5		1200
On			
"			
"			
"			

Prepaid Payment to May 75

Daily Tribune Steam Print.

Secretary.

In consideration of the granting of this license, it is mutually agreed between the Denver City Water Company and the undersigned that the Company may, without notice, shut off the water from the premises of the undersigned, should he furnish water to an occupant or owner of any building into which water is not introduced by said Company, and in such case all claims for use of water under this license shall be forfeited

Signed.

LICENSE

Block Lot

ATTACHMENT

From May 1st to November 1st, 1875.

Premises

Owner

Occupant.

_____ @ per ann _____

" "

" "

" "

" "

" "

" "

" " _____

Amount. _____

LICENSE No. _____

NOTICE. The Water will be Turned Off all Premises for Which the Water Rates are not Paid Promptly, in Advance

Denver, Colorado, _____ 187

To DENVER CITY WATER CO., Dr.

Water Rates Payable Semi-Annually, in Advance. Office, 352 1-2 Lawrence Street

To WATER RENT from this date to _____ 187_____

				SEMI-ANNUAL RATE.	
On	Store	"	per ann.		
"	Rooms	"	"		
"	Offices	"	"		
"	Bank	"	"		
"	Shop	"	"		
"	Sprinkling	"	"		
"	Water Closet	"	"		
"	Bath Rooms	"	"		
"	Urinal	"	"		
"					
"					

1201

Received Payment. _____ Sec'y

In consideration of the granting of this LICENSE, it is mutually agreed betw WATER COMPANY and the undersigned that the Company may, without notice, shut off ises of the undersigned, should he furnish water to an occupant or owner of any building into duced by said Company, or use it for other than the purposes specified in this License, and the use of water under this license shall be forfeited.

Signed, _____

LICENSE

Block Lot

ATTACHMENT

From Nov 1, 1875 to May 1st, 1876.

Premises

Owner

Occupant

Store	@	per ann
Rooms	@	"
Offices	@	"
Bank	@	"
Shop	@	"
Sprinkling	@	"
Water Closet	@	"
Bath Rooms	@	"
Urinal	@	"
Fire Plug	@	"

Amount,

LICENSE No.

NOTICE.—The Water will be turned off all Premises for which the Water Rates are not paid promptly, in advance.

Denver, Colo Nov. 1 187 5

To DENVER CITY WATER CO., Dr.

Water Rates payable semi-annually, in Advance. Office, No. 352 1-2 Lawrence Street.

To WATER RENT from this date to May 1st, 1876.

			Semi-Annual Rate
On	@	per ann.	
"	@	"	
"	@	"	
"	@	"	
"	@	"	
"	@	"	
	@	"	
	@	"	
"	@	"	
"	@	"	

Nov 75 - May 76

Received Payment.

Cashier.

1202

In consideration of the granting of this LICENSE, it is mutually agreed between the DENVER CITY WATER COMPANY and the undersigned, that the Company may, without notice, shut off the Water from the premises of the undersigned, should he furnish water to an occupant or owner of any building into which water is not introduced by said Company, or use it for other than the purposes specified in this License, and in such case all claims for the use of water under this license shall be forfeited.

Signed,

Sec'y.

LICENSE

2281 block Lot

ATTACHMENT

From Nov. 1876 to May 1st, 1877

Premises

Owner

Occupant

Rooms	@	Per ann
Water Closet	@	"
Bath	@	"
Fountain	@	"
Sprinkling	@	"
Irrigating	@	"
	@	"
	@	"

Amount

#44

LICENSE No. 2281

NOTICE.—The Water will be turned off all premises for which the Water Rates are not paid promptly, in advance.

Denver, Cala., Nov 1876.

To DENVER CITY WATER COMPANY, Dr.

payable semi-annually, in advance. Office, No. 354 Lawrence Street.

To WATER RENT from this date to May 1st, 1877.

				Semi-Annual Rate
On	Rooms	@	per ann	
"	Water Closet	@	"	
"	Bath	@	"	
"	Fountain	@	"	
"	Sprinkling	@	"	
"	Irrigating	@	"	
		@	"	
		@	"	
		@	"	
		@	"	

Received Payment,

Supt.

1203

In consideration of the granting of this LICENSE, it is mutually agreed between the DENVER CITY Water COMPANY and the undersigned, that the Company may, without notice, shut off the Water from the premises of the undersigned, should he furnish water to an occupant or owner of any building into which water is not introduced by said Company, or use it for other than the purposes specified in this License, and in such case all claims for the use of water under this License shall be forfeited.

Signed,

.....

Supt.

_____1877 License No. 1239.

Block Lot
From May 1,1877 to November 1877

Premises

License issued to

	Semi-annual Rate
Rooms	
Water closet	
Bath	
Fountain	
Sprinkling	
Irrigating	
Horse	
Cow	

go May 1877

Cash Book Folio__ Amount, _____

Whereas, the undersigned has this day applied to the Denver City Water Company, for a license to use water furnished by said company, upon and in said premises, and for purposes indicated in the schedule given upon the opposite side of this sheet, for the time there specified, which license is hereby granted; ,now therefor,

In consideration of the granting of this license, it is mutually agreed between the Denver City Water Company, and the undersigned that the company may, without notice, shut off the water from the said premises, should he furnish water to an occupant or owner of any building into which water is not introduced by said company, or use it for other than the said purposes specified in this license, and in such case all claims for the use of water under this license and all payments therefor shall be forfeited; and it is further agreed that the said company by its agents, shall have the right to enter upon or in the premises, at all proper and reasonable hours, to inspect the use of water in said premises.

_____

License No. 1239 (Notice. The water will be turned off all premises for which the water rates are not paid promptly in advance.)

Lot No.
Block No.

Denver, Colorado_____1877

Mr._____

TO DENVER CITY WATER CO, Dr.

Water rates payable semi-annually in Advance. Office No. 354 Lawrence Street.

To water rent from May 1,1877 to Nov. 1, 1877, Semi-annual Rate.

On Rooms
" Water Closet
" Bath
" Fountain
" Sprinkling
" Irrigating
" Horse
" Cow

Received Payment _____ _____
Cashier.

Whereas, the undersigned has this day applied to the ~~applied to~~ the Denver City Water Company for a license to use water furnished by said company, upon and in said premises, and for purposes indicated in the schedule given upon the opposite side of this sheet, for the time there specified, which license is hereby granted, now, therefore,

In consideration of the granting of this license, it is mutually agreed between the Denver City Water Company and the undersigned, that the company may, without notice, shut off the water from the said premises, should he furnish water to an occupant or owner of any building into which water is not introduced by said company, or use it for other than the said purposes specified in this license, and in such case all claims for the use of water under this license, and all payments therefor shall be forfeited; and it is further agreed that the said company by its agents, shall have the right to enter upon or in the premises, at all proper and reasonable hours, to inspect the use of water in said premises.

_____.

1204

May 1st, 1882. License No.___

Block Lot

From May 1st, 1882 to November 1st, 1882,

Premises
License issued to

	Semi-annual rate
Rooms	
Store	
Bath	
Water Closet	
Horse	
Cow	
Irrigating Lots	

Amount,

Cash Book Folio,_____

Whereas, the undersigned has this day applied to the ~~applied to the~~ Denver City Water Company for a license to use water furnished by said company, upon and in said premises, and for purposes indicated in the schedule given upon the opposite side of this sheet, for the time there specified, which license is hereby granted, now, therefore,

In consideration of the granting of this license, it is mutually agreed between the Denver City Water Company and the undersigned, that the company may, without notice, shut off the water from the said premises, should he furnish water to an occupant or owner of any building into which water is not introduced by said company, or use it for other than the said purposes specified in this license, and in such case all claims for the use of water under this license, and all payments therefor shall be forfeited; and it is further agreed that the said company by its agents, shall have the right to enter upon or in the premises, at all proper and reasonable hours, to inspect the use of water in said premises.

License No. _____ Block No. _____

NOTICE.—The water will be turned off all premises for which the Water Rates are not paid promptly in advance.

Lot No. _____

Denver, Colorado, May 1st, 1882.

Mr. _____

To DENVER CITY WATER CO. Dr.

Water Rates Payable Semi-Annually in Advance. OFFICE, No. 415 ARAPAHOE STREET.

To Water Rent from May 1st, 1882, to Nov. 1st, 1882.

SEMI-ANNUAL RATE

120

On Rooms,
" Store,
" Bath,
" Water Closet,
" Horse,
" Cow,
" Irrigating Lots.

To Nov 1883

Received Payment,

Cashier

WHEREAS, the undersigned has this day applied to the DENVER CITY WATER COMPANY for a LICENSE to use water furnished by said Company, upon and in said premises, and for purposes indicated in the schedule given upon the opposite side of this sheet, for the time there specified, which LICENSE is hereby granted; now, therefore,

In consideration of the granting of this LICENSE, it is mutually agreed between the DENVER CITY WATER COMPANY and the undersigned, that the Company may, without notice, shut off the water from the said premises, should he furnish water to an occupant or owner of any building into which water is not introduced by said Company, or use it for other than the said purposes specified in this LICENSE, or use it for irrigation at any other time than during the hours or in the manner specified on the face of this LICENSE, and in such case all claims for the use of water under this LICENSE, and all payments therefor shall be forfeited; and it is further agreed that the said Company, by its agents, shall have the right to enter upon or in the premises, at all proper and reasonable hours, to inspect the use of water in said premises.

Nov. 1st, 1883. License No. 1725

Block ____ Lot ____
From Nov. 1st, 1883, to May 1st, 1884.

Premises

License issued to

Semi-annual rate.

Rooms
Store
Bath
Water Closet
Horse
Cow

Amount

Cash Book Folio____

Whereas, the undersigned has this day applied to the ~~applied to the~~ Denver City Water Company for a license to use water furnished by said company, upon and in said premises, and for purposes indicated in the schedule given upon the opposite side of this sheet, for the time there specified, which license is hereby granted, now, therefore,

In consideration of the granting of this license, it is mutually agreed between the Denver City Water Company and the undersigned, that the company may, without notice, shut off the water from the said premises, should he furnish water to an occupant or owner of any building into which water is not introduced by said company, or use it for other than the said purposes specified in this license, and in such case all claims for the use of water under this license, and all payments therefor shall be forfeited; and it is further agreed that the said company by its agents, shall have the right to enter upon or in the promises, at all proper and reasonable hours, to inspect the use of water in said premises.

License No. 1725

NOTICE.—The Water will be turned off all premises for which the Water Rates are not paid promptly in advance.

Block No.
Lot No.

Denver Colorado Nov 1st 1883

Mr. Street.

To THE DENVER WATER CO., Dr.

Water Rates Payable Semi-Annually in Advance. OFFICE. No. 415 ARAPAHOE STREET.

THIS LICENSE IS ISSUED SUBJECT TO THE CONDITIONS ON THE BACK HEREOF

To Water Rent from November 1st, 1883, to May 1st, 1884.

		SEMI-ANNUAL RATE
On	Rooms,	
"	Store,	
"	Bath,	
"	Water Closet,	
"	Horse,	
"	Cow.	1206

Received Payment

Cashier.

WHEREAS, the undersigned has this day applied to THE DENVER WATER COMPANY for a LICENSE to use water furnished by said Company, upon and in said premises, and for purposes indicated in the schedule given upon the opposite side of this sheet, for the time there specified, which LICENSE is hereby granted; now, therefore,

In consideration of the granting of this LICENSE, it is mutually agreed between THE DENVER WATER COMPANY and the holder thereof, that the Company may, without notice, shut off the water from the said premises, should he furnish water to an occupant or owner of any building into which water is not introduced by said Company, or allow other persons to take it except for drinking on the premises, or use it for other than the said purposes specified in this LICENSE, or use it for Irrigation at any other time than during the hours or in the manner specified on the face of this LICENSE, and in such case all claims for the use of water under this LICENSE, and all payments therefor, shall be forfeited. And it is further agreed that the said Company, by its agents, shall have the right to enter upon or in the premises, at all proper and reasonable hours, to inspect the use of water in said premises.

Block___ License No. 1662

Lot____

From May 1st, 1891 to November 1st, 1891.

Premises,____ _____St.

_____St.

Issued to____ _____

Semi-annual rate

Rooms
Store
Bath
Water Closet
Vault
Horse
Cow
Irrigating__ lots__ _____

_____

Cash Book Folio_____

License No. 1662

NOTICE.—The Water will be turned off all premises for which the Water Rates are not paid promptly in advance.

Block No.

Lot No.

Denver, May 1. 1891

Mr. St.

To The American Water Works Co., Dr.

Water Licenses Payable Semi-Annually in Advance. Office, 634-638 Seventeenth Street, Corner California.

THIS LICENSE IS ISSUED SUBJECT TO THE CONDITIONS ON THE BACK HEREOF.

To Water Rent from May 1st, 1891, to November 1st, 1891.

		SEMI-ANNUAL RATE.	
On	Rooms,		
"	Store,		
"	Bath,		1207
"	Water Closet,		
"	Vault,		
"	Horse,		
"	Cow,		
"			
"			
"	Irrigating Lots		
	Amount,		

Received Payment

Cashier.

WHEREAS, the undersigned has this day applied to THE AMERICAN WATER WORKS COMPANY for a LICENSE to use water furnished by said Company, upon and in said premises, and for purposes indicated in the schedule given upon the opposite side of this sheet, for the time there specified, which LICENSE is hereby granted; now, therefore,

In consideration of the granting of this LICENSE, it is mutually agreed between THE AMERICAN WATER WORKS COMPANY and the holder thereof, that the Company may, without notice, shut off the water from the said premises, should he furnish water to an occupant or owner of any building into which water is not introduced by said Company, or allow other persons to take it except for drinking on the premises, or use it for other than the said purposes specified in this LICENSE, or use it for Irrigation at any other time than during the hours or in the manner specified on the face of this LICENSE, and in such case all claims for the use of water under this LICENSE, and all payments therefor, shall be forfeited. And it is further agreed that the said Company, by its agents, shall have the right to enter upon or in the premises, at all proper and reasonable hours, to inspect the use of water in said premises.

License No. 1602

NOTICE.—THE WATER WILL BE TURNED OFF ALL PREMISES FOR WHICH THE WATER RATES ARE NOT PAID PROMPTLY IN ADVANCE.

Block No.

Lot No.

Highlands Col. Denver, 18

M

St.

To THE BEAVER BROOK WATER CO., Dr.

Water Licenses Payable Semi-Annually in Advance. Office, Room 5, Granite Block, Cor. 15th and Larimer. ~~Office, Schmidt Building, Boulevard.~~

THIS LICENSE IS ISSUED SUBJECT TO THE CONDITIONS ON THE BACK HEREOF

To Water Rent from	18	to NOV 1 1891	18	SEMI-ANNUAL RATE
On Rooms,				
" Store,				
" Bath,				
" Water Closet,				
" Vault,				
" Horse				
" Vehicle				
" Cow,				
" Irrigating Lots,				
Received Payment.			Amount,	

1208

Cashier

WHEREAS, the undersigned has this day applied to THE BEAVER BROOK WATER CO. for a LICENSE to use water furnished by said Company, upon and in said premises, and for purposes indicated in the schedule given upon the opposite side of this sheet, for the time there specified, which LICENSE is hereby granted; now, therefore,

In consideration of the granting of this LICENSE, it is mutually agreed between THE BEAVER BROOK WATER COMPANY and the holder thereof, that the Company may, without notice, shut off the water from the said premises, should he furnish water to an occupant or owner of any building into which water is not introduced by said Company, or allow other persons to take it except for drinking on the premises, or use it for other than the said purposes specified in this LICENSE, or use it for Irrigation at any other time than during the hours or in the manner specified on the face of this LICENSE, and in such case all claims for the use of water under this LICENSE, and all payments therefor, shall be forfeited. And it is further agreed that the said Company, by its agents, shall have the right to enter upon or in the premises, at all proper and reasonable hours, to inspect the use of water in said premises.

_____189 License No. 270.

Block ___ Lot_____
From 6/15 1890 to 11/1,1890.
Premises _____ St.
Premises _____ St.

License issued to _____

Semi-annual rate

Rooms
Store
Bath
Water Closet
Vault
Horse
Cow

Less 20 per cent.

Irrigating Lots _____

Cash Book Folio

License No. 270. (Notice. Water will be turned off all premises for which the water rates are not paid promptly in advance) Block No___ Lot No.___

Denver _____. 189___

Mr._____ St.

To The Citizens' Water Co, Dr.

Water licenses payable semi-annually in advance.
Office 1626 Welton Street.

To water rent from_____189__ to _____189___ Semi-annual rate.

On Rooms
" Store
" Bath
" Water Closet
" Vault
" Horse
" Cow
" Less 20 per cent.
" Irrogating _____Lots_____ _____
Amount.

Received payment,

_____Cashier.

1209

_____189 License No. 2999

Block Lot

From Nov. 1st, 1890, to May 1st, 1891.

Premises_____ St.

Premises_____ St.

License issued to_____

Semi-annual rate

___Rooms
___Store
___Bath
___Water Closet
___Vault
___Horse
___Cow

_____

Cash Book Folio_____

License No. 2999

NOTICE. Water will be turned off all premises for which the Water Rates are not paid promptly in advance.

Block No.
Lot No.

Denver, 189

Mr. St.

To THE CITIZENS' WATER CO., Dr.

Water Licenses Payable Semi-Annually in Advance. OFFICE 1626 WELTON STREET.

To Water Rent from Nov. 1st, 1890, to May 1st, 1891.

		SEMI-ANNUAL RATE.
On	Rooms,	
"	Store,	
"	Bath,	
"	Water Closet,	
"	Vault,	
"	Horse,	
"	Cow,	
	Amount,	1210

Received Payment.

Cashier.

_____1894 License No. 1732

Block_____ Lot_____

From November 1st, 1894 to May 1st, 1895.

Premises_____ Street

Premises_____ Street

License issued to_____ Semi-annual rate

____Rooms
____Store
____Bath
____Water Closet
____Vault
____Horse
____Cow

_____

Cash Book Folio_____

License No A 1732

NOTICE. Water will be turned off all premises for which the Water Rates are not paid promptly in advance.

Block No. .....
Lot No. .....

Denver, Nov. 1, 1894.

Mr. ..... St.

To THE DENVER UNION WATER CO., DR.

WATER LICENSES PAYABLE SEMI-ANNUALLY IN ADVANCE AT THE OFFICE OF THE COMPANY, 501 17TH ST., COR. GLENARM.

THIS LICENSE IS ISSUED SUBJECT TO THE CONDITIONS AND AGREEMENT ON THE BACK HEREOF.

To Water Rent from November 1st, 1894, to May 1st, 1895

SEMI-ANNUAL RATE
1211

On ..... Rooms,
" ..... Store,
" ..... Bath,
" ..... Water Closet,
" ..... Vault,
" ..... Horse,
" ..... Cow,

By May 1-97

Received Payment, Amount,

Cashier.

WHEREAS, the holder of this LICENSE has paid THE DENVER UNION WATER COMPANY for a LICENSE to use water furnished by said Company, upon and in said premises, and for the purposes indicated in the schedule given upon the opposite side of this sheet, for the time therein specified, which LICENSE is hereby granted; now, therefore,

In consideration of the granting of this LICENSE, it is mutually agreed between THE DENVER UNION WATER COMPANY and the holder thereof, that the Company may, without notice, shut off the water from the said premises, should he furnish water to an occupant or owner of any building into which water is not introduced by said Company, or allow other persons to take it, except for drinking on the premises, or use it for other than the said purposes specified in this LICENSE, or use it for Irrigation at any other time than during the hours or in the manner specified on the face of this LICENSE, or allow water to be wasted by reason of defective plumbing or otherwise, and in such cases all claims for the use of water under this LICENSE, and all payments therefor, shall be forfeited. And it is further agreed that the said Company, by its agents, shall have the right to enter upon or in the premises, at all proper and reasonable hours, to inspect the use of water in said premises.

A-1537

Block____ May 1, 1897 to November 1 1897 : Amount paid : C.B. folio : Date Paid

Lot____

No_____ St. : : : .

No_____ St. : : : :

Issued to_____

Semi-annual rate : : : :

____ Rooms

____ Store

____ Bath : : : :

____ Water Closet :

____ Vault : : :

____ Horse : : : .

____ Cow

____ Irrigating___Ft. Frontage : : : :

: : : :

_____ : : : :

L. S. License_____

1212

Block
Lot

Rebate allowed only where water is turned off vacant premises BY THE COMPANY and license surrendered.

DENVER, MAY 1, ~~1896~~1897 License A 1537

No _____ St.

TO THE DENVER UNION WATER CO. DR.

OFFICE 501 17TH STREET, COR. GLENARM.

TO WATER RENT FROM MAY 1ST 1897, TO NOVEMBER 1ST 1897

THIS LICENSE IS ISSUED SUBJECT TO THE CONDITIONS AND AGREEMENT ON THE BACK HEREOF. SEMI-ANNUAL RATE

On	Rooms,	
"	Offices,	
"	Store,	
"	Bath,	
"	Water Closet,	
"	Vault,	
"	Horse,	
"	Vehicle,	
"	Cow,	
"	Irrigating ft. frontage	
"		
	Amount,	

to May 1-1903

WHEREAS, the holder of this LICENSE has paid THE DENVER UNION WATER COMPANY for a LICENSE to use water furnished by said Company, upon and in said premises, and for the purposes indicated in the schedule given upon the opposite side of this sheet, for the time therein specified, which LICENSE is hereby granted; now, therefore,

In consideration of the granting of this LICENSE, it is mutually agreed between THE DENVER UNION WATER COMPANY and the holder hereof, that the Company may, without notice, shut off the water from the said premises, should he furnish water to an occupant or owner of any building into which water is not introduced by said Company, or allow other persons to take it, except for drinking on the premises, or use it for other than the said purposes specified in this LICENSE, or use it for Irrigation at any other time than during the hours or in the manner specified on the face of this LICENSE, or allow water to be wasted by reason of defective plumbing or otherwise, and in such cases all claims for the use of water under this LICENSE, and all payments therefor, shall be forfeited. And it is further agreed that the said Company, by its agents, shall have the right to enter upon or in the premises, at all proper and reasonable hours, to inspect the use of water in said premises.

Block____
Lot____

A

May 1, 1903 to November 1, 1903

No.____ St.
No.____ St.
Issued to_____

Semi-annual rate.

_____ Rooms
_____ Bath
_____ Water Closet
_____ Horse
_____ Vehicle
_____ Cow
_____ Irrigating___ ft. frontage
_____ Offices
_____ Stores

_____ Barn_____

U. S. License

Block .....
Lot .....

Rebate allowed only where water is turned off vacant premises BY THE COMPANY and License surrendered.

DENVER, MAY 1, 1903. License A

Mr. .....St.

To THE DENVER UNION WATER CO. Dr.

OFFICE, 501 17TH STREET, COR. GLENARM.

TO WATER RENT FROM MAY 1ST, 1903, TO NOVEMBER 1ST, 1903.

THIS LICENSE IS ISSUED SUBJECT TO THE CONDITIONS AND AGREEMENT ON THE BACK HEREOF. | SEMI-ANNUAL RATE.

On	Rooms,	
"	Bath,	
"	Water Closet,	
"	Horse,	1.50
"	Vehicle,	2.00
"	Cow,	
"	Irrigating ... ft. frontage	1.50
"	Offices,	
"	Stores,	
"		
"		
	Amount,	

1213

THIS WATER LICENSE IS ISSUED BY THE DENVER UNION WATER COMPANY SUBJECT TO THE FOLLOWING TERMS:

It is agreed between THE DENVER UNION WATER COMPANY and the holder of this license that said Company shall have the right, and may without notice, shut off the water from the premises mentioned in this license should water be furnished to any other premises or for any other uses than those mentioned in this license, or if any person shall be permitted to take water from said premises to supply persons or premises not entitled thereto under this license. Water may also be shut off and this license revoked and all claims for water or payment therefor forfeited if the rules and regulations of the Company are violated, especially the following: Water shall not be allowed to run to waste. No stop cock or faucet shall be left opened or out of repair so that water can escape therefrom, or water be allowed to run to prevent freezing. All defective plumbing must be promptly repaired. Water must not be used for irrigation at any time except within the hours specified or stamped on the face of this license, and only for such time as may be sufficient to irrigate the premises for which payment is made. The Company expresly reserves the right to change or shorten said hours for irrigation.

It is further agreed that the said Company, by its agents, and employes, shall have the right to enter upon or in said premises at all proper and reasonable hours, to inspect the use of water in said premises.

1214 Case No. —. Complainant's Exhibit No. A-34. H. B. O.

(Endorsed:) 6274. U. S. District Court, District of Colorado. Plaintiff's Exhibit A-34. Filed Oct. 6, 1915. Charles W. Bishop, Clerk.

1215 *Rules and Regulations of The Denver Union Water Company for the Information and Guidance of Consumers and for the Government of Plumbers.*

Schedule of Water Rates.

1898.

1215½ *Rules and Regulations of The Denver Union Water Company for the Information and Guidance of Consumers and for the Government of Plumbers.*

Schedule of Water Rates.

1898.

1216 The Denver Union Water Company.

Directors.

Walter S. Cheesman, David H. Moffat, Moses Hallett, George W. Clayton, Thomas S. Hayden, James B. Grant, George Coppell, Edward E. Poor, Theodore C. Woodbury.

Officers.

W. S. Cheesman, President; T. S. Hayden, Vice President; D. H. Moffat, Treasurer; W. P. Miller, Secretary; J. H. Kingwill, Auditor; W. P. Robinson, Ass't Manager; C. P. Allen, Chief Engineer; D. G. Thomas, Superintendent.

1217 Information for Water Consumers.

Licensed plumbers only are permitted to do work in connection with water pipes or fixtures, and they are not allowed to turn water on to any premises except to test their work.

Parties desiring water service put into their premises have only to sign an application and agreement at the Water Company's office, on which a permit will be issued to any licensed plumber. When the work is completed to the satisfaction of the Company, on payment of water tax at the Company's office, the water will be turned on the premises.

No deduction will be made from the rates on account of any fixtures not being used; if they are not wanted, have a plumber

disconnect them from the service pipes, and then the charge for their use will cease.

In making application for water it is unnecessary to state that there is a well or cistern on the premises, or that artesian water is used, or that a small quantity of water is used, as such facts can not affect the rates.

Consumers must keep their service pipes and fixtures in order, at their own expense.

1218 Care should be taken to see that the stop box at the curb is in order, as damage frequently occurs from pipes bursting, where the water can not be turned off readily, on account of the stop box being inaccessible. When stop boxes are covered by sidewalks or grass plots, the top of the box must be brought through and to a level with the top of the walk or surface of ground. In case a pipe bursts inside a building, water may be turned off by the occupant at a "stop and waste" cock, which should be found just where the pipe enters through the cellar wall. Consumers should see that this stop and waste cock is always in good working order, and instruct servants or members of the family as to its location and use. During cold weather, the house pipes should be drained through this stop and waste cock, to prevent freezing and bursting of pipes.

See that your service pipes are at least five feet under ground.

Examine the waste opening at the bottom of your hydrant, and see that it is unobstructed.

If the pipe enters your house, see that a stop and waste cock is placed just where the pipe comes through the cellar wall.

1219 During cold weather, shut the water off the house at night, and drain your house pipes through the stop and waste cock. Open all faucets in the house, so that the pipes will empty, but close them immediately, or otherwise you may flood the house when water is turned on in the morning.

In case the water does not flow at once after turning it on in the morning, apply hot water or hot cloths just above or below the stop and waste cock.

It is sometimes necessary for the Company to shut off the water in making repairs, or in case of breaks in the main pipes. As soon as you discover that the water is off, open the hot water faucet and let it stand open until the water runs. This will prevent accident by allowing the escape of steam from the boiler.

The use of hose for irrigating lots is only allowed during the hours specified in the license, and in every case a nozzle must be attached to the hose, with an outflow not greater than one quarter of one inch.

Many persons do not understand why the water at times has a milky appearance when first drawn: it is caused by air in the water, and is entirely harmless.

1220 Rules and Regulations to be Observed by Consumers.

The Company imposes no restrictions on water takers, which impair their right to use all the water necessary for the various

purposes for which licenses are issued, but only such as are necessary to prevent waste, and for the mutual protection of the Water Company and the consumer.

The following rules and regulations of the Denver Union Water Company are made a part of the contract with every person who takes water, and every such person in his application for water agrees to be bound thereby.

Section 1. Water will not be turned on to any premises until water license is paid, nor until, in addition thereto, all arrearages for water charges with reference to said premises have also been paid.

Sec. 2. Applications for water must be made at the office of the Company, by the owner or occupant of the property, and must state all purposes for which it is required; and when paying the semi-annual charges questions relating to its consumption must be truthfully answered by the applicant. In case of misrepresentation
1221 on the part of the applicant, or the uses of the water for purposes not embraced in his license, or of wilful or unreasonable waste of water, the supply of water will be stopped, unless the party shall promptly pay such additional charges as the Company may impose.

Sec. 3. Water rents must be paid in advance, on the first days of May and November in each year, at the office of the Company; and any person taking a license for the use of water in or upon any premises, will be required to pay the schedule rates for such premises, for all purposes for which water is required thereon; and if such water is received through a meter, he shall pay the schedule rates on such premises, and such sum in addition thereto as the meter shows has been taken, at meter rates; provided, that in all cases the party shall pay at least the schedule rates fixed for such premises for all purposes.

Sec. 4. No hydrant, goose neck, hose bib, or hose attachment shall be placed in any yard or area of any premises, so situated as to be accessible to persons living in or occupying neighboring premises; nor shall water takers be allowed to supply water to others, except by a special permit from this Company.

1222 Sec. 5. The inspector, or other authorized agent of the Company, shall have free access at reasonable hours, to any premises where water is used, for the purpose of inspection and examination.

Sec. 6. All persons taking water shall keep their own service pipes, stop cocks, and apparatus in good repair, and protected from frost, at their own expense; and it is expressly stipulated that no claim shall be made against the Company by reason of the bursting, or freezing, or any other derangement of any service pipes, or other apparatus in connection with them.

Sec. 7. In case of fire or an alarm of fire, and while fire pressure is on the pipes, the use of fountains, or yard and street sprinklers, is positively prohibited, and the Company reserves the right to place automatic shut-off valves on all service pipes, at the expense of owners

of the premises, for the purpose of shutting off water during times of fire.

Sec. 8. In no case will hose be allowed for the purpose of sprinkling gardens, lawns, sidewalks, or streets, or washing wagons, or other vehicles, with outflows or nozzles greater than one-quarter of one inch in diameter, and in no case will the use of hose without a nozzle be permitted.

1223 Sec. 9. In case two or more parties or families are supplied with water from the same service pipe, if either of the parties fails to pay the water rent when due, or to comply with any rule of the Company, the Company may turn off the water from such pipe until the water rent is paid, and the rules strictly complied with.

Sec. 10. No fountain shall run for more than six months, nor more than four hours per day.

Sec. 11. Water for irrigation shall be used only during the hours and in the manner specified on the license.

Sec. 12. Irrigation of lots, including sidewalks and trees, only through hose with nozzle not to exceed one-quarter of one inch in diameter, to be used only in accordance with the regulations of this Company.

Sec. 13. All waste of water is prohibited, and consumers must keep their hydrants, faucets, valves, hose, and other apparatus, including stop boxes, street washers and service pipes, in good order and condition, at their own expense, and all water ways closed when not in use.

Sec. 14. Water must not be left running to keep pipes from freezing.

1224 Sec. 15. The Company reserves the right to require any consumer to furnish a meter and pay for water by meter measurement.

Sec. 16. The Company reserves the right at any time, without notice, to shut off the water in its mains, for the purpose of making repairs or extensions, or for other necessary purposes; and all persons having boilers on their premises, depending upon the pressure in the pipes to keep them supplied, are hereby cautioned against danger from collapse.

Sec. 17. No rebate on any license will be allowed, except where the premises become vacant and the water is turned off by the Company; in such case, on surrender of the license, a rebate may be allowing for the unexpired time, less one dollar for the expense of shutting off the water.

Sec. 18. In any case where the water shall have been turned off of premises, by reason of water tax not being paid, a charge of one dollar will be made to meet the expense incurred in turning on the water when the tax is paid. But if the turning off at the box shall not be sufficient to prevent the turning on the same, or the taking of water without license, or payment, then the same may be cut off at the main, and before the water shall be turned on the

1225 person desiring the same upon such premises shall pay the cost and expense of turning off and on the same, including

the digging in the street or through pavement, and the amount required to be paid to the city for permit and as deposit on account of such cutting of pavement.

Sec. 19. Licenses for water for building purposes will be issued only upon a certificate of the architect, of the work to be done, specifying the number of brick, perches of stone, and square yards of plastering, for which water will be required; and in all cases payment for the water shall be a condition precedent to the issuance of the license.

Sec. 20. Water used for building purposes must be discharged through a hose directly into the mortar bed, and under no circumstances shall it be discharged upon the ground, or into or through a ditch or trench, and the builders must properly guard the hose connection or cock through which the water is taken, so as to render it inaccessible to others.

Sec. 21. No alteration, addition or disconnection in or about any conduit, service pipe, or water cock, or other apparatus connected therewith, shall be made or caused to be made by any person except a licensed plumber, who shall first obtain a written permit at the office of the Company.

1226 Sec. 22. When any job of plumbing shall be completed, and the work approved by the inspector of the Company, and the water tax paid, the water will be turned on, and not otherwise.

Sec. 23. Hose license, or a license to irrigate lots, will not be granted unless a license is taken for all purposes for which water is to be used on the premises.

Sec. 24. Hydraulic elevators and indicators must be kept in repair and proper working order at the expense of the owner or occupant of the premises. When the indicator fails to register, and is not repaired immediately, the supply will be shut off, unless a rate satisfactory to the Company be paid for the time the indicator is out of order.

Sec. 25. Water for motors or elevators will be furnished only through meters at schedule rates.

Section. 26. For any violation of any of these rules by any person or persons, the Company reserves the right to stop his or her supply of water, and the water rent already paid may be forfeited.

Sec. 27. The right is reserved to alter, amend, or add to these rules and regulations from time to time, as in the judgment of the Company it shall be deemed expedient or necessary.

1227 Rules and Regulations for the Government of Licensed Plumbers.

Section 1. Every plumber shall, before making any connection with any main or doing any work on any service pipe connected therewith, give to The Denver Union Water Company a bond in the penal sum of one thousand dollars, with good and sufficient surety, conditioned, that he will in all things well and truly comply

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with all the rules and regulations of this Company, for the government of plumbers.

Sec. 2. No plumber shall allow his name to be used by any other plumber or person, directly or indirectly, to obtain a permit to do any work under his bond.

Sec. 3. All work on the streets must be done to the satisfaction of the Company, as directed by its manager or foreman.

Sec. 4. All excavations in the streets and alleys of the city must be done in accordance with the ordinances and requirements of the City Council of the City of Denver or other municipalities where excavations are to be made.

1228 Sec. 5. No street shall be opened or water pipe tapped, or service pipe be laid down, without written permission, and then only by persons authorized by the Water Company; and the particular person to be employed must in each case be named in the permit. The ferrule inserted in the distributing main, and the service pipe to be laid, must be of the size specified in the permit.

Sec. 6. The tapping of mains shall be under the exclusive control of the Company, and the size of the tap to be inserted shall in all cases be determined by the manager of the Company.

Sec. 7. No alteration, addition or disconnection of any fixture, in or about any conduit, pipe or water cock, or apparatus connected therewith, shall be made, or caused to be made by any plumber, for any person taking water, or for any person whatsoever, without notice thereof being previously given to and written permission granted by the Company.

Sec. 8. Any violation of Section 7 will render the plumber liable to a fine of not less than $5.00 for each service pipe or fixture connected, and the water rates upon the same from the time such connection was made, according to the Company's schedule.

1229 Sec. 9. Notice must be left at the office of the Company by the plumber about to lay down a service pipe, fixing the day on which he wishes the tap made. Such notice must be given at least twenty-four hours previous to the time when the excavation is begun.

Sec. 10. All service pipes must be of lead, and not less in weight than that called "extra strong."

Sec. 11. All service pipes must be laid at least five feet below the established grade of the streets, and in all places at least five feet below the surface of the ground.

Sec. 12. A stop cock, with a round water way, shall be inserted in each service pipe in every case, and protected by a box (to be supplied by the Company, at the expense of the owner of the premises), with a cast iron cover, having the words "Denver Union Water Co." thereon; the box shall be placed by the plumber on the edge of the sidewalk, near the curb, the top even with the pavement, and visible.

Sec. 13. When more than one building is supplied by a single tap, by means of branch service pipes, each branch pipe must have

a stop cock, with like box and cover complete, to be located on the sidewalk in like manner as required by Section 11.

1230 Sec. 14. Every service pipe shall have a brass stop and waste cock, placed within the cellar wall of the building, easily accessible to the occupant, so that the water may be drained from the pipes in the house by the occupant, to prevent freezing and bursting of pipes; the use of said stop and waste cock must be fully explained to occupants by plumber doing the work.

Sec. 15. No hydrant, goose neck, hose bib or faucet shall be located outside of the premises for which a license is issued, nor in any open area or place accessible from adjoining premises; nor over any slop sink or sewer connection.

Sec. 16. Water closets, vaults and urinals must be supplied with self-closing valves, that close with the pressure, and in no case will a bib or a faucet be allowed to be placed over a closet or urinal.

Sec. 17. No plumber shall leave the water on after completing the plumbing.

Sec. 18. Private mains shall not be laid in advance of or beyond the terminus of the Company's pipes, except at the option of the Company.

Sec. 19. A street washer will not be allowed on the sidewalk, except where the building is set out to the street line, thus

1231 leaving no room for it inside the lot.

Sec. 20. Where service pipes are found disconnected at the corporation cock or main, they may be reconnected only by the Company.

Sec. 21. All outlets in service pipes must be provided with air chambers not less than 18 inches on first floors, and 12 inches on upper floors. All air chambers must be securely capped.

Sec. 22. Corporation cocks will be furnished and taps made by the Company at the following prices:

For ⅜ inch Corporation Cock and Tapping	$2.00
For ½ inch Corporation Cock and Tapping	3.00
For ⅝ inch Corporation Cock and Tapping	4.00
For ¾ inch Corporation Cock and Tapping	5.00
For 1 inch Corporation Cock and Tapping	6.00
Stop Box and Water Way	2.50

Sec. 23. Any violation of any of the above rules by any plumber, shall be deemed a breach of the conditions of his bond.

1232 Water Rates of The Denver Union Water Company.

1898.

Schedule of yearly water rates, payable semi-annually, in advance, on the first days of May and November of each year, at the office of the company, calculated on minimum basis. By minimum is meant, for stores, shops and business places, 12 feet frontage, 500 square feet area space and least favorable location.

Alcohol, each barrel manufactured	$.07		
Ale Cellar, from	13.00	to	$32.00
Bakery, each oven, from	8.60	to	40.00
Barber Shop, first chair	6.80		
" each additional chair	2.40		
Bath, private, with heating apparatus, first tub	4.00		
Bath, private, each additional tub	3.55		
Bath, private, without heating apparatus, first tub	1.60		

1233

Bath, private, each additional tub, (without heating apparatus)	$2.90		
Bath in boarding or tenement houses, 15 rooms or less	4.00		
Over 15 rooms, each	8.00		
Bath, public (including every bath except the above) each	11.00		
Beer, for each barrel brewed	.06		
Beer House, from	13.00	to	$32.00
Beer Pump	16.65		
Billiard Saloon, first table	4.75		
Each additional table	2.40		
Boarding House, per room	1.05		
But no license less than	10.00		
Bottling Works, from	8.25	to	32.00
Book Binbery, not less than	7.75		
Bowling Alley, from 1 to 3 alleys, not less than	6.80		
Brick Work, per thousand	.08		
Brick Yard, each gang of hands	20.35		
Camphene, each barrel manufactured	.10		
Candle Manufactory, from	85.65	to	400.00
Candy Manufactory, from	17.00	to	60.00

1234

Church, including baptistry, from	$6.40	to	$12.00
Cigar Manufactory, per hand	1.40		
But no license less than	7.10		
Club Room, from	10.80	to	80.00
Coffee Saloon, from	9.35	to	24.00
Cow, each	.80		
Concrete, per cubic yard	.02		
Distillery, for each barrel distilled	.07		
Dram Shop or Saloon, from	13.00	to	60.00
Dyeing and Scouring, from	22.00	to	60.00
Forge, each	2.10		
Fountains, for six months, running not more than 4 hours per day, viz:			
1 opening 1/16-inch diameter	11.50		
1 opening ⅛-inch diameter	19.30		

1 opening 3/16-inch diameter	33.00	
1 opening ¼-inch diameter	36.00	
1 opening 5/16-inch diameter	51.50	
1 opening ⅜-inch diameter	70.60	
1 opening 7/16-inch diameter	93.00	
1 opening ½-inch diameter	118.30	
Hall, public, from	6.60 to	24.00
Hat Manufactory, from	9.50 to	60.00

1235

Horse, in private stable	$2.15	
Hose, for private stable, not less than	4.00	
Hose, for livery or sale stable	18.55	
Hose, for sprinkling sidewalks and washing windows, where irrigation rates are not paid, per foot front	.11	
Hotel, up to 12 rooms, with 12 persons or less, per room	1.05	
Over 12 rooms, per room	1.20	
Ice Cream Saloon, from	9.10 to	$32.00
Laboratory, from	24.50 to	80.00
Laundry, from	17.00 to	240.00
Livery Stable, per stall (including boarding and club)	1.95	
Lunch in Saloon, from	12.00 to	24.00
Malting, per 100 bushels	1.10	
Motor, church organ, from	25.00 to	32.00
Oyster Saloon, from	9.40 to	24.00
Offices and Banks on street, from	4.45 to	24.00
Offices, above first floor, each	2.35	
Packing House, from	46.00 to	400.00
Photograph Gallery, from	12.10 to	32.00
Plastering, per 100 square yds	.28	

1236

Porter Cellar, from	$13.00 to	$32.00
Rectifying Whisky, per 100 barrels	3.40	
Residence occupied by one family only:		
1 room	3.15	
2 rooms	3.15	
3 rooms	3.90	
4 rooms	4.25	
5 rooms	4.90	
6 rooms	5.90	
7 rooms	7.35	
8 rooms	7.70	
9 rooms	8.35	
10 rooms	8.70	
11 rooms	9.35	
12 rooms	9.85	

13 rooms	10.45
14 rooms	10.45
15 rooms	11.60
16 rooms	11.95
17 rooms	12.35
18 rooms	12.45
19 rooms	12.90
20 rooms	13.00

1237

Residence of 10 or more rooms used as a boarding house, 12 persons or under, per room	$1.05
Residence of less than 10 rooms used as a boarding house, 12 persons or under, per room	1.08
Restaurant, from	11.50 to $80.00
Rooms in blocks or over business houses, per room	1.20
Stable, Sale, per stall	2.00
School, for every scholar	.12
Shop, from	4.45 to 240.00
Slaughter House, from	28.30 to 400.00
Soap Manufactory, from	85.60 to 600.00
Soda Manufactory, from	46.00 to 160.00
Spirit Gas, for each barrel manufactured	.10
Starch Manufactory, from	46.00 to 160.00
Steam Boilers, per square foot of heating surface, 24 hours per day	.52
But no license less than	10.00
Either for the season or per annum.	

1238

Steam Boilers for heating buildings or tenement houses only, per square foot of fire surface	$0.04
But no license less than	8.00
Which is the rate per annum or season.	
Steam Boiler for heating private residence	4.00
For season or entire year.	
Stock Yard, from	28.30 to $400.00
Stone Work, per perch	.06
Store, from	4.45 to 240.00
Store, Confectionery, from	7.75 to 32.00
Store, Meat or Butcher Shop, from	6.10 to 24.00
Sugar Refinery, from	240.00 to 2,400.00
Tannery, not less than	28.30
Tenement, per room	1.05
But no license less than	10.00
Tobacco Manufactory, per hand	1.40
But no license less than	7.10

Urinal Basin, private, in boarding houses, stores and offices, as distinguished from public	8.00
1239 Urinal Basin, public, for each stall	$8.85
Vault, for residence, with water connection, direct or indirect	3.20
Vault, accomodating double house, each house	2.40
Vault, accomodating more than one tenant, each tenant	2.40
Vault for tenement or boarding house, for every 15 rooms or less	4.00
Vault, bar	4.00
Vehicle	1.45
Vinegar, for each barrel manufactured	.06
Washing Bottles, not less than	16.70
Washing Barrels, per barrel	.06
Washing Meat, from	22.65 to $400.00
Water Closet, private house, boarding or tenement house, first bowl	4.00
Each additional bowl	3.15
Water Closet, public, meaning hotel, saloon, sporting house and where the public 1240 may use it, as distinguished from private, boarding or tenement house	$6.50
Wine Cellar, from	13.00 to $32.00
Fountain in drug store, six months, opening not to exceed 1/8-inch in diameter	35.80
Tumbler Washer in drug store, six months	32.00

Irrigation Rates.

Irrigation of lots, including sidewalk and trees, only through hose with nozzle not to exceed one-quarter of one inch in diameter, to be used only within the hours specified on the license and never during a fire or conflagration, 22 cents per front foot for the season. Where irrigation is used outside of property line along the side of irrigated corner lots, the frontage is counted to include one-half lot additional. No license for irrigation will be issued for less than the season rate.

1241 Meter Rates—Payable Monthly.

1,000 to	15,000	gal. per mo.,	17c	per	1,000	gal.
15,000 to	30,000	" "	16c	"	"	"
30,000 to	60,000	" "	15c	"	"	"
60,000 to	150,000	" "	13c	"	"	"
150,000 to	315,000	" "	12c	"	"	"
315,000 to	637,500	" "	11c	"	"	"
637,500 to	1,500,000	" "	10c	"	"	"
or over						

Minimum meter rate for business premises, $3.00 per month.
Minimum meter rate for residences, 25 cents per month.
Where water is paid for all purposes on premises, there will be no additional charge for a standpipe for fire protection.
Where The Denver Union Water Company's water is not used, a special rate will be made for such standpipes.
The Denver Union Water Company, under its contract as set forth and made a part of Schedule "A," has the right to require any customer to furnish a meter and pay for water by meter measurement under the schedule hereinbefore provided, under "meter rates."

1242 Case No. —. COMPLAINANT'S EXHIBIT No. A-35. H. B. O.

(Endorsed:) 6274. U. S. District Court, district of Colorado. Plaintiff's Exhibit A-35. Filed Oct. 6, 1915. Charles W. Bishop, Clerk.

1243 Case No. —.

COMPLAINANT'S EXHIBIT No. A-36.

Rules and Regulations of The Denver Water Company for the Information and Guidance of Consumers. 1887.

1244 Rules and Regulations to be Observed by Consumers.

The Company imposes no restrictions on water takers, which impair their right to use all the water necessary for the various purposes for which licenses are issued, but only such as are necessary to prevent waste, and for the mutual protection of the Water Company and the consumer.

The following rules and regulations of the Denver Water Company are made a part of the contract with every person who takes water, and every such person in his application for water agrees to be bound thereby.

Section 1. Water will not be turned on to any premises until water license is paid.

Sec. 2. Applications for water must be made at the office of the Company, by the owner or occupant of the property, and must state all purposes for which it is required; and when paying the semi-annual charges, questions relating to its consumption must be truthfully answered by the applicant. In case of misrepresentation on the part of the applicant, or the uses of the water for purposes not embraced in his license, or of willful or unreasonable waste of water, the supply of water will be stopped, unless the party shall promptly pay such additional charges as the Company may impose.

Sec. 3. Water rents must be paid in advance, on the first days of May and November in each year, at the office of the Company; and any person taking a license for the use of water in or upon any premises, will be required to pay the schedule rates for such prem-

ises, for all purposes for which water is required thereon; and if such water is received through a meter, he shall pay the schedule rates on such premises, and such sum in addition thereto as the meter shows has been taken, at meter rates, provided, that in all cases the party shall pay at least the schedule rates fixed for such premises for all purposes.

Sec. 4. No hydrant, goose neck, hose bibb, or hose attachment, shall be placed in any yard or area of any premises, so situated as to be accessible to persons living in or occupying neighboring
1245 premises; nor shall water takers be allowed to supply water to others, except by a special permit from this Company.

Sec. 5. The inspector, or other authorized agent of the Company, shall have free access at reasonable hours, to any premises where water is used, for the purpose of inspection and examination.

Sec. 6. All persons taking water, shall keep their own service pipes, stop cocks and apparatus in good repair, and protected from frost, at their own expense; and it is expressly stipulated, that no claim shall be made against the Company by reason of the bursting, or freezing, or any other derangement of any service pipes, or other apparatus in connection with them.

Sec. 7. In case of fire, or an alarm of fire, and while fire pressure is on the pipes, the use of fountains, or yard and street sprinklers, is positively prohibited, and the Company reserves the right to place automatic shut-off valves, on all service pipes, at the expense of owners of the premises, for the purpose of shutting off water during times of fire.

Sec. 8. In no case will hose be allowed for the purpose of sprinkling gardens, lawns, sidewalks, or streets, or washing wagons, or other vehicles, with outflows or nozzles greater than one-quarter of an inch in diameter, and in no case will the use of hose with a nozzle be permitted.

Sec. 9. In case two or more parties or families are supplied with water from the same service pipe, if either of the parties fails to pay the water rent when due, or to comply with any rule of the Company, the Company may turn off the water from such pipe, until the water rent is paid, and the rules strictly complied with.

Sec. 10. No yard fountain shall be used longer than ten hours daily, and not after ten o'clock P. M., without payment of additional charges.

Sec. 11. Water for irrigation shall be used only during the hours and in the manner specified on the license.

Sec. 12. A license to use water on a lot does not include sidewalk or street.

1246 Sec. 13. All waste of water is prohibited, and consumers must keep their hydrants, faucets, valves, hose, and other apparatus, including stop boxes, street washers and service pipes, in good order and condition, at their own expense, and all water ways closed when not in use.

Sec. 14. Water must not be left running to keep pipes from freezing.

Sec. 15. The Company reserves the right to set meters whenever,

and in such places only, as it may deem best. All meters shall be and remain the property of the Company, and may be removed whenever the Company may elect to do so.

Sec. 16. The Company reserves the right at any time, without notice, to shut off the water in its mains, for the purpose of making repairs or extensions, or for other necessary purposes; and all persons having boilers on their premises, depending upon the pressure in the pipes to keep them supplied, are hereby cautioned against danger from collapse.

Sec. 17. No rebate on any license will be allowed, except where the premises become vacant, and the water is turned off by the Company; in such case, on surrender of the license, a rebate may be allowed for the unexpired time, less one dollar for the expense of shutting off the water.

Sec. 18. In any case where the water shall have been turned off of premises, by reason of water tax not being paid, a charge of one dollar will be made to meet the expense incurred in turning on the water, when the tax is paid.

Sec. 19. Licenses for water for building purposes, will be issued only upon a certificate of the architect, of the work to -- done, specifying the number of brick, perches of stone, and square yards of plastering, for which water will be required; and in all cases payment for the water shall be a condition precedent to the issuance of the license.

Sec. 20. Water used for building purposes must be discharged through a hose directly into the mortar bed, and under no circumstances shall it be discharged upon the ground, or into or through a ditch or trench, and the builders must properly guard the hose connection or cock through which the water is taken, so as to render it inaccessible to others.

1247 Sec. 21. No alteration, addition, or disconnection in or about any conduit, service pipe, or water cock, or other apparatus connected therewith, shall be made, or caused to be made, by any person except a licensed plumber, who shall first obtain a written permit at the office of the Company.

Sec. 22. When any job of plumbing shall be completed, and the work approved by the inspector of the Company, and the water tax paid, the water will be turned on, and not otherwise.

Sec. 23. Hose license, or a license to irrigate lots, will not be granted, unless a license is taken for all purposes for which water is to be used on the premises.

Sec. 24. Hydraulic elevators and indicators must be kept in repair and proper working order at the expense of the owner or occupant of the premises. When the indicator fails to register, and is not repaired immediately, the supply will be shut off, unless a rate satisfactory to the Company be paid for the time the indicator is out of order.

Sec. 25. Water for motors or elevators will be furnished only through meters at schedule rates.

Sec. 26. For any violation of any of these rules by any person or

persons, the Company reserves the right to stop his or her supply of water, and the water rent already paid may be forfeited.

Sec. 27. The right is reserved to alter, amend or add to these rules and regulations from time to time, as in the judgment of the Company it shall be deemed expedient or necessary.

1248 *Rules and Regulations of The Denver Water Company for the Information and Guidance of Consumers.* 1890.

1249 Rules and Regulations to be Observed by Consumers.

The Company imposes no restrictions on water takers, which impair their right to use all the water necessary for the various purposes for which licenses are issued, but only such as are necessary to prevent waste, and for the mutual protection of the Water Company and the consumer.

The following rules and regulations of the Denver Water Company are made a part of the contract with every person who takes water, and every such person in his application for water agrees to be bound thereby.

Section 1. Water will not be turned on to any premises until water license is paid.

Sec. 2. Applications for water must be made at the office of the Company, by the owner or occupant of the property, and must state all purposes for which it is required; and when paying the semi-annual charges, questions relating to its consumption must be truthfully answered by the applicant. In case of misrepresentation on the part of the applicant, or the uses of the water for purposes not embraced in his license, or of wilful or unreasonable waste of water, the supply of water will be stopped, unless the party shall promptly pay such additional charges as the Company may impose.

Sec. 3. Water rents must be paid in advance, on the first days of May and November in each year, at the office of the Company; and any person taking a license for the use of water in or upon any premises, will be required to pay the schedule rates for such premises, for all purposes for which water is required thereon; and if such water is received through a meter, he shall pay the schedule rates on such premises, and such sum in addition thereto as the meter shows has been taken, at meter rates, provided, that in all cases the party shall pay at least the schedule rates fixed for such premises for all purposes.

1250 Sec. 4. No hydrant, goose neck, hose bibb, or hose attachment, shall be placed, in any yard or area of any premises, so situated as to be accessible to persons living in or occupying neighboring premises; nor shall water takers be allowed to supply water to others, except by a special permit from this company.

Sec. 5. The inspector, or other authorized agent of the Company, shall have free access at reasonable hours, to any premises where water is used, for the purpose of inspection and examination.

Sec. 6. All persons taking water, shall keep their own service

pipes, stop cocks, and apparatus in good repair, and protected from frost, at their own expense; and it is expressly stipulated, that no claim shall be made against the Company by reason of the bursting or freezing, or any other derangement of any service pipes, or other apparatus in connection with them.

Sec. 7. In case of fire or an alarm of fire, and while fire pressure is on the pipes, the use of fountains, or yard and street sprinklers, is positively prohibited, and the Company reserves the right to place automatic shut-off valves, on all service pipes, at the expense of owners of the premises, for the purpose of shutting off water during times of fire.

Sec. 8. In no case will hose be allowed for the purpose of sprinkling gardens, lawns, sidewalks, or street, or washing wagons, or other vehicles, with outflows or nozzles greater than one-quarter of an inch in diameter, and in no case will the use of hose without a nozzle be permitted.

Sec. 9. In case two or more parties or families are supplied with water from the same service pipe, if either of the parties fails to pay the water rent when due, or to comply with any rule of the Company, the Company may turn off the water from such pipe, until the water rent is paid, and the rules strictly complied with.

Sec. 10. No yard fountain shall be used longer than ten hours daily, and not after ten o'clock P. M., without payment of additional charges.

Sec. 11. Water for irrigation shall be used only during the hours and in the manner specified on the license.

Sec. 12. A license to use water on a lot does not include sidewalk or street.

1251 Sec. 13. All waste of water is prohibited, and consumers must keep their hydrants, faucets, valves, hose, and other apparatus, including stop boxes, street washers and service pipes, in good order and condition, at their own expense, and all water ways closed when not in use.

Sec. 14. Water must not be left running to keep pipes from freezing.

Sec. 15. The Company reserves the right to require any customers to furnish a meter and pay for water by meter measurement.

Sec. 16. The Company reserves the right at any time, without notice, to shut off the water in its mains, for the purpose of making repairs or extensions, or for other necessary purposes; and all persons having boilers on their premises, depending upon the pressure in the pipes to keep them supplied, are hereby cautioned against danger from collapse.

Sec. 17. No rebate on any license will be allowed, except where the premises become vacant and the water is turned off by the Company; in such case, on surrender of the license, a rebate may be allowed for the unexpired time, less one dollar for the expense of shutting off the water.

Sec. 18. In any case where the water shall have been turned off of premises, by reason of water tax not being paid, a charge of one

dollar will be made to meet the expense incurred in turning on the water, when the tax is paid.

Sec. 19. Licenses for water for building purposes, will be issued only upon a certificate of the architect, of the work to be done, specifying the number of brick perches of stone, and square yards of plastering, for which water will be required; and in all cases payment for the water shall be a condition precedent to the issuance of the license.

Sec. 20. Water used for building purposes must be discharged through a hose directly into the morter bed, and under no circumstances shall it be discharged upon the ground, or into or through a ditch or trench, and the builders must properly guard the hose connection or cock through which the water is taken, so as to render it inaccessible to others.

1252 Sec. 21. No alteration, addition or disconnection in or about any conduit, service pipe, or water cock, or other apparatus connected therewith, shall be made or caused to be made, by an- person except a licensed plumber, who shall first obtain a written permit at the office of the Company.

Sec. 22. When any job of plumbing shall be completed, and the work approved by the inspector of the Company, and the water tax paid, the water will be turned on, and not otherwise.

Sec. 23. Hose license, or a license to irrigate lots, will not be granted, unless a license is taken for all purposes for which water is to be used on the premises.

Sec. 24. Hydraulic elevators and indicators must be kept in repair and proper working order at the expense of the owner or occupant of the premises. When the indicator fails to register, and is not repaired immediately, the supply will be shut off, unless a rate satisfactory to the Company be paid for the time the indicator is out of order.

Sec. 25. Water for motors or elevators will be furnished only through meters at schedule rates.

Sec. 26. For any violation of any of these rules by any person or persons, the Company reserves the right to stop his or her supply of water, and the water rent already paid may be forfeited.

Sec. 27. The right is reserved to alter, amend, or add to these rules and regulations from time to time, as in the judgment of the Company it shall be deemed expedient or necessary.

(Endorsed:) 6274. U. S. District Court, district of Colorado. Plaintiff's Exhibit A-36. Filed Oct. 6, 1915. Charles W. Bishop, Clerk.

1253 Case No. —.

COMPLAINANT'S EXHIBIT No. A-37. H. B. O.

Rules and Regulations to Be Observed by Consumers of The Beaver Brook Water Co. and The Mountain Water Co.

1254 Rules and Regulations to Be Observed by Consumers.

The Company imposes no restrictions on water takers, which impair their right to use all the water necessary for the various purposes for which licenses are issued, but only such as are necessary to prevent waste, and for the mutual protection of the Water Company and the consumer.

The following rules and regulations of The Beaver Brook Water Company and The Mountain Water Company are made a part of the contract with every person who takes water and every such person in his application for water agrees to be bound thereby.

Section 1. Water will not be turned on to any premises until water license is paid.

Sec. 2. Application for water must be made at the office of the Company, by the owner or occupant of the property, and must state all purposes for which it is required; and when paying the semi-annual charges, questions relating to its consumption must be truthfully answered by the applicant. In case of misrepresentation on the part of the applicant, or the uses of water for purposes not embraced in his license, or of wilful or unreasonable waste of water, the supply of water will be stopped unless the party shall promptly pay such additional charges as the Company may impose.

Sec. 3. Water rents must be paid in advance, on the first days of May and November in each year, at the office of the Company; and any person taking a license for the use of water in or upon any premises, will be required to pay the schedule rates for such premises, for all purposes for which water is required thereon; and if such water is received through a meter, he shall pay the schedule rates on such premises, and such sum in addition thereto as the meter shows has been taken, at meter rates, provided, that in all cases the party shall pay at least the schedule rates fixed for such premises for all purposes.

Sec. 4. No hydrant, goose neck, hose bibb or hose attachment, shall be placed in any yard, or area of any premises, so situated as to be accessible to persons living in or occupying neighboring premises; nor shall water takers be allowed to supply water to others, except by a special permit from this company.

1255 Sec. 5. The inspector, or other authorized agent of the Company, shall have free access at reasonable hours to any premises where water is used, for the purpose of inspection and examination.

Sec. 6. All person- taking water, shall keep their own service pipe, stop cocks, and apparatus in good repair and protected from frost, at their own expense; and it is expressly stipulated, that no claim shall

be made against the Company by reason of the bursting or freezing, or any other derangement of any service pipe, or other apparatus in connection with them.

Sec. 7. In case of fire, or an alarm of fire, and while fire pressure is on the pipes, the use of fountains, or yard and street sprinklers, is positively prohibited, and the Company reserves the right to place automatic shut-off valves on all service pipes, at the expense of owners of premises, for the purpose of shutting off water during times of fire.

Sec. 8. In no case will hose be allowed for the purpose of sprinkling gardens, lawns, sidewalks or streets, or washing wagons or other vehicles, with outflows or nozzles greater than one-quarter of an inch in diameter, and in no case will the use of hose without a nozzle be permitted.

Sec. 9. In case two or more parties or families are supplied with water from the same service pipe, if either of the parties fail to pay the water rent when due, or to comply with any rule of the company, the Company may turn off the water from such pipe, until the water rent is paid, and the rules strictly complied with.

Sec. 10. No yard fountain shall be used longer than ten hours daily, and not after 10 o'clock P. M., without payment of additional charges.

Sec. 11. Water for irrigation shall be used only during the hours and in the manner specified on the license.

Sec. 12. A license to use water on a lot does not include sidewalk or street.

Sec. 13. All waste of water is prohibited, and consumers must keep their hydrants, faucets, valves, hose and other apparatus, including stop-boxes, street washers, and service pipes, in good order and condition, at their own expense, and all water ways closed when not in use.

1256 Sec. 14. Water must not be left running to keep pipes from freezing.

Sec. 15. The Company reserves the right to set meters whenever, and in such places only, as it may deem best. All meters shall be and remain the property of the Company, and may be removed whenever the Company may elect to do so.

Sec. 16. The Company reserves the right at any time, without notice, to shut off the water in its mains, for the purpose of making repairs or extensions, or for other necessary purposes; and all persons having boilers on their premises depending upon the pressure in the pipes to keep them supplied, are hereby cautioned against danger from collapse.

Sec. 17. No rebate on any license will be allowed, except where the premises become vacant and the water is turned off by the Company, in such case, on surrender of the license, a rebate may be allowed for the unexpired time, less one dollar for the expense of shutting off the water.

Sec. 18. In any case where the water shall be turned off of premises, by reason of water tax not being paid, a charge of one dollar will be made to meet the expense incurred in turning on the water, when tax is paid.

Sec. 19. Licenses for water for building purposes, will be issued only upon a certificate of the architect, of the work to be done, specifying the number of brick, perches of stone, and square yards of plastering, for which water will be required; and in all cases the payment for the water shall be a condition precedent to the issuance of the license.

Sec. 20. Water used for building purposes must be discharged through a hose directly into the mortar bed, and under no circumstances shall it be discharged upon the ground, or into or through a ditch or trench, and the builders must properly guard the hose connection or cock through which the water is taken, so as to render it inaccessible to others.

Sec. 21. No alteration, addition or disconnection in or about any conduit, service pipe or water cock or other apparatus connected therewith shall be made or caused to be made, by any person, except through the office of the Company.

Sec. 22. Hose license, or a license to irrigate lots, will not be granted, unless a license is taken for all purposes for which water is to be used on the premises.

Sec. 23. Water for motors or elevators will be furnished only through meters at schedule rates.

1257 Sec. 24. All faucets placed over hand basins or sinks, together with all urinals and water closets wherever situated, shall be operated with self-closing valves, that close with the water pressure, except over bath tubs and stationary laundry tubs, where compression cocks may be used.

Sec. 25. For any violation of any of these rules by any person or persons, the Company reserves the right to stop his or her supply of water, and the water rent already paid may be forfeited.

Sec. 26. The right is reserved to alter, amend, or add to these rules and regulations from time to time, as in the judgment of the Company it shall be deemed expedient or necessary.

Sec. 27. Corporation cocks will be furnished and the taps made by the Company as follows:

For Corporation Cock and Tap	$5.00
For Stop Box and Water Way	3.25

Sec. 28. Notice must be left at the office of the Company, fixing the day on which he wishes the tap made. Such notice must be given at least twenty-four hours previous to the time when the excavation is begun.

Sec. 29. No plumber shall leave the water on after completing the plumbing.

Sec. 30. Private mains shall not be laid in advance of, or beyond the terminus of the Company's pipes, except at the option of the Company.

(Endorsed:) 6274. U. S. District Court, District of Colorado. Plaintiff's Exhibit A-37. Filed Oct. 6, 1915. Charles W. Bishop, Clerk.

(Here follow fac-similes, marked pages 1258 and 1259.)

PLUMBERS' APPLICATION FOR ATTACHMENT

THE DENVER UNION WATER COMPANY: *Denver, Colo.,* ..... 191....

Please make a ..... *inch attachment to the main to supply premises belonging to* .....*, located as follows: Block* ..... *Lot* .....

On ..... *Street, between* ..... *and* ..... *Street Water District No.* .....

Stop Box to be located at curb line on ..... *side of* ..... *Street,* ..... *feet* ..... *from the* ..... *line of* ..... *Street.*

DESCRIPTION OF PREMISES

KIND OF BUILDING	NO. ROOMS	NO. BATHS	NO. WATER CLOSETS	EXTRAS

DIAGRAM

Case No____. Complainant's exhibit No. A-61.

ALLEY

For

For

Licensed Plumber.

Permit No. .....

OFFICE OF

$ .....

The Denver Union Water Company

1654 BROADWAY

Denver, ... *191*

Received from ..... *Licensed Plumbers:*

..... *Dollars, for* ..... *inch*

corporation cock, ... *stop box, water way and tapping the*

distribution or ..... *main on* ..... *side of* ..... *Street,*

between ..... *and* ..... *Streets.*

to supply premises owned by .....

RULES AND REGULATIONS FOR THE GOVERNMENT OF LICENSED PLUMBERS

Section 1. Every plumber shall, before making any connection with any main, or doing any work on any service pipe connected therewith, give to The Denver Union Water Company a bond in the penal sum of one thousand dollars, with good and sufficient surety, conditioned that he will in all things well and truly comply with all the rules and regulations of this Company, for the government of plumbers.

Sec. 2. No plumber shall allow his name to be used by any other plumber or person, directly or indirectly, to obtain a permit to do any work under his bond.

Sec. 3. All work on the streets must be done to the satisfaction of the Company, as directed by its manager or foreman.

(Endorsed)6274.US.District Court, District of Colorado. PLAINTIFF'S EXHIBIT A-61.Filed Oct. 6 1915, Charles W. Bishop, Clerk.

1259

SERVICE PERMIT

No. .....

191

Amt.

Div. Clk.

1260 COMPLAINANT'S EXHIBIT A-75. A. W. H.

Comparative Statement of Net Valuations Placed on Lands of the Denver Union Water Company.

1261 COMPLAINANT'S EXHIBIT A-75.

Comparative Statement of Net Valuations Placed on Lands of the Denver Union Water Company.

The items covered appear on Pages 111 to 115, inclusive, of Exhibit C.

Column 1 contains the valuations placed upon the various properties and testified to by the City's Appraisers, Messrs. A. C. Anderson and J. I. Carper.

Column 2 contains the valuations placed upon all of the properties by the Public Utilities Engineers and testified to by Mr. E. C. Van Diest.

Column 3 contains the valuations placed upon said properties by Messrs. Leonard Metcalf and George G. Anderson, being the valuations enumerated in Exhibit C.

Column 4 contains the valuations placed on the various properties by The Denver Union Water Company's Appraisers, the valuations on land outside the City and County of Denver being agreed to by Messrs. C. W. Bowles and A. D. Wall, the valuations on city property being the average of the appraised valuations independently arrived at and testified to by Messrs. E. R. Conaway, H. W. Newcomb and W. W. Watson.

It will be noted from the testimony that the figures in Column 1 do not include improvements of any character. The figures in Columns 2-3-4 include the value of farm improvements only.

On page 7 will be found a comparison of the major differences.

	1 City's Appraisers.	2 Pub. Uti. Engineers.	3 Metcalf & Anderson.	4 Water Co. Appraisers.
Item 1.				
Lake Cheesman Reservoir and Lands. Parcel 8, Douglas, and Parcel 7, Jefferson, 8435.96 acres.....	$36,284	$40,799	$200,000	.....
Item 2.				
Platte River Stone Placer Mining Claim. Parcel 7, Douglas and Parcel 6, Jefferson, 152.624 acres.....	765	915	3,600	765
Item 3.				
Platte Canon Valley. Parcel 3, Douglas, and Parcel 1, Jefferson, 306.65 acres.....	1,533	2,108	7,500	3,065
Item 4.				
Platte Canon Reservoir Site. Parcel 4, Douglas 7.768 ac..	100	125	9,000*	115
Parcel 5, Douglas, 85.25 ac.....	....	5,315		7,275
Item 5.				
Platte Canon Filter Site. Parcel 2, Jefferson, 3.22 ac.....	....	260		140
Parcel 3, Jefferson, 11.06 ac.....	....	620		340
Item 6.				
Platte Canon Power House Site. Parcel 4, Jefferson, 22.99 ac.....	700	700	7,850†	780
Item 7.				
Lands Bordering and Through Which River Runs. Parcel 5, Jefferson, 19.95 ac. 1,300.....	1,300	1,300		300

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SE BOUND
L IN BOOK

Parcel 6, Douglas, 10.3 ac.	....	693	(Item 4*)	155
		$52,835	$227,950	

* Includes Parcels 4-5-6, Douglas.
† Includes Parcels 2-3-4-5, Jefferson.

65—736

1263 Forward		$52,835	$227,950		
Item 8. Lehow Lake. Parcel 42, Jefferson, 13.08 ac.	....	425	2,500	520	
Item 9. Phebe Strong Ranch. Parcel 39, Jefferson, 320 ac.; Parcel 38, Jefferson, 200 ac.; Parcel 40, Jefferson, 160 ac.; Parcel 41, Jefferson, 160 ac. Total 680 ac.	17,930	19,980	18,080	18,080	
Item 10. William Strong Ranch and Canon Filter Plant. Parcel 37, Jefferson, Parcel 1, Douglas, 280 ac.	21,074	22,599	15,800	15,800	
Item 11. Becky Archer Ranch. Parcel 36, Jefferson, Parcel 2, Douglas, 160 ac.	14,120	14,945	13,100	13,100	
Item 12. Frank Archer Ranch. Parcel 35, Jefferson, 587.6 ac.	37,450	52,490	37,900	37,900	

		1 City's Appraisers.	2 Pub. Utl. Engineers.	3 Metcalf & Anderson.	4 Water Co. Appraisers.
Item 13.					
Mountain Reservoir Site. Parcel 43, Jefferson, Parcel 44, Jefferson, 810 ac., Parcel 45, Jefferson		4,050	4,300	6,075	6,075
Item 14.					
Dam and Headgate, Harriman Ditch. Parcel 26, Jefferson, 11.84 ac.		....	692	1,500	1,000
Harriman Ditch Fencing		....	.....	50	50
Item 15.					
Harriman Lake. Parcel 27, Jefferson,	3.5 ac.				
Parcel 28, Jefferson,	6.5 ac.				
Parcel 29, Jefferson,	80.0 ac.				
Parcel 30, Jefferson,	40.0 ac.				
Total	130.0	——	5,000	8,450	8,450
Item 16.					
Marston Lake Flume.					
Parcel 34, Jefferson,	1.52 ac.				
Parcel 32, Jefferson,	3.02 ac.				
Parcel 33, Jefferson,	3.03				
Total	7.58 ac.	250	500	1,137	1,137
Forward			$173,766	$332,542	

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VERTICAL IN

1264	Forward			$173,766	$332,542	
	Item 17.	Acres.				
	Marston Lake Reservoir. Parcel 14, Jefferson	320.00				
	Parcel 11, Jefferson	88.03				
	Parcel 13, Jefferson	106.67				
	Parcel 25, Jefferson	2.14				
	Parcel 23, Jefferson	42.11				
	Parcel 21, Jefferson	8.28				
	Parcel 18, Jefferson	120.90				
	Parcel 19, Jefferson	16.84				
	Parcel 16, Jefferson	28.59				
	Parcel 15, Jefferson	28.44				
	Parcel 17, Jefferson	6.57				
	Parcel 12, Jefferson	0.215				
	Parcel 24, Jefferson	1.709				
	Parcel 20, Jefferson	67.28				
	Parcel 22, Jefferson	2.45				
	Total	840.224	....	125,000	168,000	71,780
	Item 18.	Acres.				
	Littleton Mill. Parcel 24, Arapahoe	3.50	2,500	2,500	— 4,450	4,450
	Parcel 25, Arapahoe	10.00	1,000	1,050		
	Total	13.50				
	Item 19.					
	Sullivan Reservoir Site. Parcel 7, Arapahoe, 80 acres		1,000	1,000	2,000	2,000

		1 City's Appraisers.	2 Pub. Uti. Engineers.	3 Metcalf & Anderson.	4 Water Co. Appraisers.
Item 20.					
Cherry Creek Galleries. Parcel 6, Arapahoe	40.31 ac.				
Parcel 5, Arapahoe	16.10 ac.				
Parcel 2, Arapahoe	1.10 ac.				
Parcel 4, Arapahoe	34.53 ac.				
Parcel 3, Arapahoe	55.00 ac.				
Total	147.04 ac.	4,125	6,125	8,500	4,370
Item 21.					
Ashland Avenue Reservoir. Parcel 8, Jefferson, 8.37 ac.		....	6,750	5,859	5,859
Item 22.					
Ashland Ave. Pumping Station. Parcel 9, Jefferson, 4 lots		400	400)		
Parcel 10, Jefferson, 7 lots		525	525)	1,508	1,508
			$317,116	$522,859	
1265 Forward			$317,116	$522,859	
Item 23.					
De Lappe Place for Pumping Station. (Not in use.) Parcel 2, City & County of Denver, 3 1/5 lots		450	450	676	676

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Item 24.				
Cottage Hill Tank Site. Parcel 3, City & County of Denver, 43 lots	2,050	2,050	6,808	6,808
Item 25.				
West Denver Pumping Station. Parcel 14, C. & C. of D., 3 lots	900	1,090	1,500	1,500
Parcel 9, C. & C. of D. 9.25 ac.				
Parcel 15, C. & C. of D. 1.00 ac.				
Parcel 16, C. & C. of D. 0.21 ac.				
Total 10.46 ac.	31,500	33,470	50,557	50,557
Item 26.				
Tail Race from West Denver Pumping Station.				
Parcel 13, C. & C. of D. 1.90 ac.				
Parcel 12, C. & C. of D. 0.64 ac.				
Parcel 10, C. & C. of D. 1.65 ac.				
Parcel 11, C. & C. of D. 1.20 ac.				
Total 5.39 ac.	6,210	8,445	10,731	10,731
Item 27.				
Lake Archer Canal & Lands.				
Parcel 17, C. & C. of D. 3.03 ac.				
Parcel 18, C. & C. of D. 1.00 ac.				
Parcel 19, C. & C. of D. 0.88 ac.				
Parcel 20, C. & C. of D. 17.31 ac.				
Parcel 22, C. & C. of D. 1.127 ac.				

		1 City's Appraisers.	2 Pub. Uti. Engineers.	3 Metcalf & Anderson.	4 Water Co. Appraisers.
Parcel 23, C. & C. of D.	0.969 ac.				
Parcel 21, C. & C. of D.	1.01 ac.				
Parcel 24, C. & C. of D.	20.97 ac.				
Parcel 25, C. & C. of D.	10.20 ac.				
Parcel 26, C. & C. of D.	8.34 ac.				
Parcel 27, C. & C. of D.	5.184 ac.				
Parcel 28, C. & C. of D.	7.896 ac.				
Parcel 30, C. & C. of D.	15.847 ac.				
Parcel 29, C. & C. of D.	0.02 ac.				
Parcel 31, C. & C. of D.	20.00 ac.				
Parcel 32, C. & C. of D.	6.06 ac.				
Parcel 33, C. & C. of D.	13.31 ac.				
Parcel 34, C. & C. of D.	0.275 ac.				
Total	133.428 ac.	53,076	133,430	208,306	205,162
Forward			$496,051	$801,437	
1266 Forward			$496,051	$801,437	
Item 28.					
University Park Storage Tank Site. Parcel 8, C. & C. of D. 4 lots		200	200	233	233

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Item 29.				
South Denver Pumping Station Site. Parcel 7, C. & C. of D. 14 lots	1,000	1,000	1,083	1,083
Item 30.				
Office and Superintendent's Residence, Littleton. Parcel 1, Arapahoe, 20 lots	2,800	2,800	3,250	3,250
Item 31.				
Storage Tank Site, Highland Park. Parcel 4, C. & C. of D., 2 lots	500	500	533	533
Item 32.				
Lots in Cottage Hill. Parcel 5, C. & C. of D. 46 lots	2,025	2,025	6,808	6,808
Item 33.				
Lots Adjoining Cheesman Park Reservoir Site. Parcel 6, C. & C. of D. 24 lots	240	240	367	367
Forward		$502,816	$813,711	

				1 City's Appraisers.	2 Pub. Uti. Engineers.	3 Metcalf & Anderson.	4 Water Co. Appraisers.
1267	Forward				$502,816	$813,711	
	Item 34.						
	Forty-inch Conduit No. 3.						
	Parcel 46, Jefferson	9.2	ac.				
	Parcel 47, Jefferson	2.	"				
	Parcel 48, Jefferson	3.	"				
	Parcel 49, Jefferson	12.40	"				
	Parcel 50, Jefferson	4.28	"				
	Parcel 51, Jefferson	3.5	"				
	Parcel 52, Jefferson	5.8	"				
	Parcel 53, Jefferson	9.15	"				
	Parcel 54, Jefferson	3.65	"				
	Parcel 55, Jefferson	2.3	"				
	Parcel 56, Jefferson	2.77	"				
	Parcel 57, Jefferson	5.881	"				
	Parcel 8, Arapahoe	11.18	"				
	Parcel 9, Arapahoe	1.15	"				
	Parcel 10, Arapahoe	3.00	"				
	Parcel 11, Arapahoe	5.50	"				
	Parcel 12, Arapahoe	0.53	"				
	Parcel 13, Arapahoe	4.52	"				
	Parcel 14, Arapahoe	3.22	"				
	Parcel 16, Arapahoe	1.515	"				
	Parcel 15, Arapahoe	20.00	"				
	Total	114.546	"	500	....	1,500	1,500

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Item 35.					
Conduit No. 6.					
Parcel 17, Arapahoe	2.096 "	....	6,970*	22,028	22,028
Parcel 18, Arapahoe	2.34 "				
Parcel 19, Arapahoe	1.17 "				
Parcel 20, Arapahoe	1.94 "				
Parcel 21, Arapahoe	2.50 "				
Parcel 22, Arapahoe					
Parcel 23, Arapahoe	2.38 "				
Total	12.426 "				
Item 36.					
Conduit No. 7.					
Parcel 58, Jefferson	3.057 "				
Parcel 59, Jefferson	9.112 "				
Parcel 60, Jefferson	1.522 "				
Parcel 61, Jefferson	3.046 "				
Parcel 62, Jefferson	0.763 "				
Total	17.500 "				

* Includes Parcel 15, Arapahoe.

Item 37.				
Rights of Way where fee is not owned	....	3,815	17,400	17,400
Total net valuations		$513,601	$854,639	

Major Differences Only.

	Public Utilities Engineers.	Metcalf and Anderson.
Item 1. Lake Cheesman	$40,799	$200,000
Items 2 to 8 inc. Platte Canon Lands	12,461	30,450

No.	P. U. E.	M. & A.
2	$915	$3,600
3	2,108	7,500
4	5,440	9,000*
5	880	
6	700	7,850
7	1,993	
8	425	2,500
	$12,461	$30,450

* Includes part of Item 7.

Item 17. Marston Lake	125,000	168,000

Items 25-26-27, West Denver Pumping Station, Lake Archer, etc.

No.	P. U. E.	M. & A.

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25	$1,090	$1,500		
	33,470	$50,557		
26	8,445	10,731		
27	133,430	208,306		
	$176,435	$271,094	176,435	271,094
Items 34-35-36. Conduit Lands			6,970	23,528
Item 37. Rights of Way			3,815	17,400
			$365,480	$710,472

Difference in value on the six properties enumerated, $710,472 — $365,480 = $344,992.
Difference in total net values (see page 6) $854,639 — $513,601 = $341,038.

It will be noted that the differences in values on all other lands are comparatively small and approximately balance each other.

(Endorsed:) 6274. U. S. District Court, District of Colorado. Plaintiff's Exhibit A-75. Filed Oct. 6, 1915. Charles W. Bishop, Clerk.

1269 Case No. —.

COMPLAINANT'S EXHIBIT No. A-80.

Shortage of Supply for Platte Canon Ditch.

Year.	Cu. ft. per sec.	Per cent.	No. of days of record.
1900.....	6.45	11.53	139
1902.....	28.80	51.40	224
1903.....	5.71	10.19	277
1904.....	2.03	3.62	347
1905.....	0	0	237
1906.....	0	0	248
1907.....	0.16	0.28	287
1908.....	5.56	9.92	252
1909.....	3.14	5.60	365
1910.....	5.35	9.56	364
1911.....	6.35	11.64	365
1912.....	4.60	8.22	335
1913.....	0	0	275
Mean.....	4.85	8.66	3,715
(Omitting 1902) Mean.....	3.32	5.93	3,491

(Endorsed:) 6274. U. S. District Court, district of Colorado. Plaintiff's Exhibit A-80. Filed Oct. 6, 1915. Charles W. Bishop, Clerk.

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Case No. —.

COMPLAINANT'S EXHIBIT No. A-88. M. H.

PLAINTIFF'S EXHIBIT No. A-88.

Lake Cheesman.

Estimates of Available Storage as Submitted in Testimony.

1271

Lake Cheesman.

Estimates of Available Storage.

1900. Month.	Actual storage, ac. ft.	Field, ac. ft.	Fellows, ac. ft.	Bull, ac. ft.	Anderson, ac. ft.	Comstock, ac. ft.	Notes.
January	.....	.....	1,600	.....	1,612	1,618	
February	.....	.....	.....	.....	1,512	1,512	
March	.....	.....	4,920	.....	4,960	4,956	
April	.....	.....	15,120	.....	15,240	15,248	Rainfall 8.24 in.—4 times normal.
May	.....	.....	60,650	.....	61,194	.....	
June	.....	.....	37,994	.....	72,240	.....	Stream flow at Cheesman from 1,000 to 2,000 sec. ft. first 16 days.
July	.....	.....	.....	.....	1,426	.....	
August	.....	.....	.....	.....	.....	.....	
September	.....	.....	.....	.....	.....	.....	
October	.....	.....	.....	.....	5,208	.....	86 sec ft. left in main stream compared with 62 in 1902.
November	.....	.....	3,864	.....	4,180	.....	
December	.....	.....	2,040	.....	2,046	.....	
			126,188		169,578		

Estimates of Available Storage.

1901. Month.	Actual storage, ac. ft.	Field, ac. ft.	Fellows, ac. ft.	Bull, ac. ft.	Anderson, ac. ft.	Comstock, ac. ft.	Notes.
January	.....	.....	224	890	868	.....	
February	.....	.....	830	840	840	.....	
March	.....	.....	4,130	4,170	4,154	.....	
April	536	.....	11,790	11,900	11,880	.....	
May	2,760	.....	19,944	14,800	13,826	.....	
June	3,037	.....	.....	9,360	7,320	.....	Water within 1 feet of masonry on 16th.
July	536	.....	.....	.....	186	.....	
August	.....	.....	.....	6,000	9,300	.....	
September ...	.....	.....	.....	.....	4,500	.....	
October	.....	.....	.....	3,600	1,612	.....	
November ...	.....	.....	6,180	6,230	6,240	.....	
December ...	.....	.....	5,360	5,430	5,456	.....	
			48,458	63,220	66,182		

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Lake Cheesman.

Estimates of Available Storage.

1902. Month.	Actual storage, ac. ft.	Field, ac. ft.	Fellows, ac. ft.	Bull, ac. ft.	Anderson, ac. ft.	Comstock, ac. ft.	Notes.
January	.....	3,826	3,812	3,830	3,844	3,826	
February	.....	486	1,055	1,080	984	1,090	
March	.....	1,680	1,383	2,520	2,542	2,520	
April	1,473	5,896[a]	5,831	.....	780	5,896	
May	.....	.....	.....	.....	.....	498	
June	.....	.....	.....	.....	.....	.....	
July	.....	.....	.....	.....	.....	.....	
August	.....	.....	.....	.....	.....	.....	
September ...	.....	.....	.....	.....	.....	.....	Rainfall 3.70 in.—3½ times normal.
October	740	.....	.....	.....	744	2	
November ...	772	.....	.....	.....	1,200	1,178	
December ...	.....	.....	861	910	868	866	
		11,888[b]	12,942	8,340	10,962	15,876	

[a] Given as 5,896 in Exhibits 30 and 32, as 5,890 in Exhibit 45, as 5980 in Exhibit 47.
[b] Given as 11,888 in Exhibits 30 and 32, as 11,882 in Exhibits 45 and 47.

Estimates of Available Storage.

1903. Month.	Actual storage, ac. ft.	Field, ac. ft.	Fellows, ac. ft.	Bull, ac. ft.	Anderson, ac. ft.	Comstock, ac. ft.	Notes.
January	.....	.....	.....	550	558	530	
February	.....	.....	.....	220	224	216	
March	2,540	2,331	1,883	2,800	2,790	2,802	
April	5,369	5,229	6,188	5,200	5,400	6,256	
May	854	.....	.....	.....	806	354	
June	2,464	8,444	.....	2,000	1,800	18,492	
July	.....	.....	.....	.....	.....	1,090	
August	.....	.....	.....	.....	.....	210	
September ...	.....	.....	.....	.....	.....	2,820	
October	.....	.....	.....	.....	.....	1,576	
November ...	.....	3,270	3,570	3,610	3,600	3,608	
December ...	.....	62	922	910	930	906	
		19,336	12,563	15,290	16,108	38,862	

Estimates of Available Storage.

1904. Month.	Actual storage, ac. ft.	Field, ac. ft.	Fellows, ac. ft.	Bull, ac. ft.	Anderson, ac. ft.	Comstock, ac. ft.	Notes.
January	.....	218	246	220	248	218	
February	.....	368	345	370	348	368	
March	.....	2,638	2,410	2,680	2,666	2,676	
April	983	3,285	3,749	1,500	1,200	3,794	
May	5,394	5,289	8,082	5,100	5,580	8,260	Rainfall 3.27 in.—30% above normal
June	19,142	.....	.....	15,000	17,820	6,070	" 3.54 " — 2½ times "
July	3,009	176	.....	5,000	2,356	2,150	" 2.13 " —20% above "
August	.....	4,190	4,137	.....	.....	14,138	Combined rainfall for above 3 mos., practically 60% above normal.
September	.....	2,524	.....	800	780	7,440	
October	1,197	1,546	2,729	2,000	1,464*	8,510	
November	.....	2,994	2,218	4,100	4,080	4,098	
December ...	.....	1,411	1,414	1,440	1,426	1,444	
		24,639	25,330	38,210	37,968	59,166	

NOTE *.—Storage in October leaves average flow of 279 second feet in stream.

Lake Cheesman.

Estimates of Available Storage.

1905. Month.	Actual storage, ac. ft.	Field, ac. ft.	Fellows, ac. ft.	Bull, ac. ft.	Anderson, ac. ft.	Comstock, ac. ft.	Notes.
January	.....	636	.....	640	620	636	
February	.....	1,032	1,000	1,030	1,008	1,032	
March	.....	7,714	7,624	7,710	7,688	7,714	Rainfall 3.07 in.—3 times normal.
April	15,171	15,296	15,174	15,300	15,330	15,296	" 4.95 " —2½ " "
May	7,651	28,722	28,530	28,750	28,768	28,756	" 2.65 " —above "
June	.....	19,774	11,521	24,890	24,900	24,454	
July	.....	.....	.....	.....	.....	112	
August	.....	.....	.....	.....	.....	314	
September ...	.....	.....	.....	.....	4,500	4,832	
October	.....	.....	.....	.....	4,216	Rainfall 2.31 in.—2½ times normal.	
November ...	.....	4,326	4,284	4,330	4,320	4,326	
December ...	.....	990	.....	990	992	990	
		78,490	68,133	83,640	92,342	92,618	

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Estimates of Available Storage.

1906. Month.	Actual storage, ac. ft.	Field, ac. ft.	Fellows, ac. ft.	Bull, ac. ft.	Anderson, ac. ft.	Comstock, ac. ft.	Notes.
January	.....	298	.....	300	310	298	
February	.....	372	.....	370	392	372	
March	2,883	3,558	3,383	3,560	3,534	3,558	Rainfall 3.67 in.—80% above normal.
April	.....	12,518[a]	12,734	12,850	12,840	12,854	
May	.....	16,308[b]	16,294	16,420	15,500	16,408	
June	.....	420	.....	4,600	.....	8,986	
July	.....	.....	.....	.....	.....	6,932	
August	.....	.....	.....	.....	.....	1,630	
September	.....	5,720[c]	2,699	5,180	9,000	15,638	Rainfall 2.72"—2½ times normal. Latter half of month—Dist. #2, "all ditches supplied."
October	.....	13,042	13,369	14,200	18,228	18,184	Rainfall 1.98"—Twice normal. All thr-u- month—Dist. #2, "all ditches supplied."
November	.....	12,966	12,853	12,970	12,960	12,966	
December	.....	5,510	5,472	5,510	5,518	5,510	
		70,712	66,804	75,960	78,282	103,366	

[a] Given as 12,398 ac. ft. in Exhibits 30 and 32.
[b] Given as 16,230 ac. ft. in Exhibits 30 and 32.
[c] Given as 5,550 ac. ft. in Exhibit 30.

Estimates of Available Storage.

1907. Month.	Actual storage, ac. ft.	Field, ac. ft.	Fellows, ac. ft.	Bull, ac. ft.	Anderson, ac. ft.	Comstock, ac. ft.	Notes.
January	.....	3,124	3,136	3,120	3,100	3,124	
February	.....	3,686	3,665	3,690	3,696	3,686	
March	.....	7,164	7,133	7,160	7,192	7,164	
April	.....	8,614	9,640	7,672	1,500	9,746	Rainfall 2.91″—43% above normal.
May	.....	8,882	13,062	15,670	.....	14,706	Rainfall 2.93″—slightly " "
June	.....	14,132	9,969	29,910	21,000	29,924	
July	.....	17,334	17,352	41,630	24,800	41,660	
August	.....	6,274	9,793	20,310	24,800	20,630	
September ...	.....	1,224	.....	770	6,000	9,052	
October	1,779	.....	.....	2,428	3,720	7,878	All needs supplied in Dist. #2 Storage in Cheesman to spillway level.
November ...	.....	4,016	4,106	4,140	4,140	4,136	
December ...	.....	1,654	1,660	1,650	1,674	1,654	
		76,104	79,516	138,150	101,622	153,360	

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Lake Cheesman.

Estimates of Available Storage.

1908. Month.	Actual storage, ac. ft.	Field, ac. ft.	Fellows, ac. ft.	Bull, ac. ft.	Anderson, ac. ft.	Comstock, ac. ft.	Notes.
January	.....	614	.....	620	620	614	
February	.....	500	.....	520	522	500	
March	1,355	4,334	4,858	4,900	4,898	4,924	Water reached spillway level March 16.
April	.....	1,416	6,605	.....	.....	6,632	
May	.....	.....	.....	.....	.....	.....	
June	.....	.....	.....	.....	.....	.....	
July	.....	.....	.....	.....	.....	.....	
August	.....	.....	.....	.....	.....	2,834	Rainfall 3.19 in.—nearly 2½ times normal.
September	.....	.....	.....	.....	.....	690	
October	.....	.....	.....	.....	3,534	3,454	Rainfall 1.90 in.—nearly twice normal. Snow in Dist. 2 Oct. 17.
November	.....	3,356	3,332	3,360	3,360	3,356	
December	.....	1,170	296	1,190	1,178	1,170	
		11,390	15,091	10,590	14,112	24,174	

Estimates of Available Storage.

1909. Month.	Actual storage. ac. ft.	Field, ac. ft.	Fellows, ac. ft.	Bull, ac. ft.	Anderson, ac. ft.	Comstock, ac. ft.	Notes.
January	.....	64	130	1,020	992	994	
February	.....	30	.....	1,090	1,064	1,038	
March	.....	2,516	2,582	2,610	2,644	2,588	Rainfall 3.03 in. —3 times normal.
April	14,500	13,238	14,579	14,680	14,700	14,708	" 2.59 " —28% above "
May	4,531	2,824	4,386	11,290	11,160	10,716	" 1.74 " —70% of normal.
June	.....	7,438	.....	24,240	24,480	24,326	" 1.70 " —above "
July	.....	8,794	751	22,538	29,574	26,364	" 4.17 " —over twice "
August	.....	15,156	20,614	24,134	34,100	28,246	" 2.13 " —60% above "
September.. .	.....	50,768	51,590	50,520	52,020	52,010	" 3.78 " —3½ times "
October	.....	17,214	20,290	20,580	20,130	20,452	Leaves 277 sec. ft. in stream.
November ...	.....	8,626	8,569	8,640	8,640	8,626	
December ...	.....	6,614	6,579	6,570	6,634	6,630	
		133,282	130,070	187,912	206,138	196,698	

Field from Exhibit 45 only.

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Lake Cheesman.

Estimates of Available Storage.

1910. Month.	Actual storage, ac. ft.	Field, ac. ft.	Fellows, ac. ft.	Bull, ac. ft.	Anderson, ac. ft.	Comstock, ac. ft.	Notes.
January	.....	4,722	4,666	4,770	4,712	4,722	
February	.....	1,458	1,442	1,670	1,456	1,458	
March	.....	18,418	18,476	18,370	18,662	18,674	2,000 acre ft. storage in Antero.
April	.....	10,532	10,455	10,580	10,560	10,532	500 " " " " "
May	.....	6,216	10,828	.....*	4,464	16,302	1,000 " " " " "
June	.....	.....	.....	.....	.....	3,826	
July	2,573	1,240	.....	.....	.....	3,998	Rainfall 3.47 in.—twice normal.
August	1,568	808	.....	.....	.....	4,830	
September ...	.....	.....	.....	.....	.....	.....	
October	.....	.....	.....	.....	4,030	3,850	
November ...	.....	3,392	3,362	4,400	4,380	3,860	
December	.....	622	750	1,730	1,736	1,748	
		47,408	49,979	41,520	50,000	73,800	

NOTE *.—Mr. Bull withdrew estimate of 6,610 acre feet in May, stating that 3,400 acre feet should be added in first three months of 1911.

Estimates of Available Storage.

1911. Month.	Actual storage, ac. ft.	Field, ac. ft.	Fellows, ac. ft.	Bull, ac. ft.	Anderson, ac. ft.	Comstock, ac. ft.	Notes.
January		416	735	680*	744	760	
February		494	730	1,120*	1,120	1,134	1,300 ac. ft. stored in Antero to March 1st.
March	3,985	4,480	4,604	4,500*	4,650	4,624	2,200 ac. ft. stored in Antero.
April		2,744	5,703			5,740	500 " " " "
May						1,598	
June	4,912					6,740	
July	6,430				17,484	22,352	
August						178	
September						2,320	
October	2,133	80			2,170	4,586	4,500 ac. ft. stored in Antero.
November		1,454	524	2,520	2,580	2,550	
December		162		870	806	810	2,500 ac. ft. stored in Antero in November and December.
		9,830	12,296	9,690	29,954	53,392	

NOTE.—The additions of the storage in Antero Reservoir total 11,000 ac. ft
NOTE *.—3,400 acre feet not added in any Exhibit.

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Lake Cheesman.

Estimates of Available Storage.

1912. Month.	Actual storage, ac. ft.	Field, ac. ft.	Fellows, ac. ft.	Bull, ac. ft.	Anderson, ac. ft.	Comstock, ac. ft.	Notes.
January	.....	104	104	650	682	654	
February	.....	.....	.....	770	812	784	
March	.....	1,470	1,422	1,980	1,984	1,960	
April	7,511	4,884	8,019	8,100	8,100	8,100	2,400 ac. ft. stored in Antero in March and April.
May	11,030	7,328	11,600	11,610	11,718	10,532	Rainfall 4.18 in.—66% above normal. 1,800 ac. ft. stored in Antero.
June	8,810	25,968	25,065	33,700	33,900	33,788	Rainfall 2.27 in.—60% above normal. 10,200 ac. ft. stored in Antero.
July	.....	17,740	20,943	43,800	43,958	42,178	Rainfall 2.90 in.—60% above normal, 3,500 ac. ft stored in Antero.
August	.....	9,694	11,331	28,100	28,396	22,252	5,500 ac. ft. stored in Antero.
September ...	.....	120	.....	8,700	8,700	7,420	1,000 ac. ft. stored in Antero.
October	2,885	368	.....	6,770	6,386	6,370	
November ...	.....	7,670	8,019	8,940	8,100	8,070	
December ...	.....	1,530	1,496	1,550	1,550	1,530	
		76,876	87,999	153,770	154,286	143,638	

The following amounts were stored in District No. 2 during 1912:

April	6,370	acre feet
May	10,500	" "
June	9,290	" "
July	12,400	" "
August	5,710	" "
September	8,186	" "
October	23,380	" "
November	15,600	" "
Total	**91,436**	**acre feet**

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Lake Cheesman.

Estimates of Available Storage.

1913. Month.	Actual storage. ac. ft.	Field. ac. ft.	Fellows. ac. ft.	Bull. ac. ft.	Anderson. ac. ft.	Comstock. ac. ft.	Notes.
January	.....	778	799	775	806	778	
February	.....	606	595	611	616	606	
March	.....	1,192	1,168	910	1,178	1,192	
April	5,763	15,052	15,888	15,240	16,020	16,036	
May	.....	4,106	8,424	8,494	8,494	8,514	
June	.....	470	.....	.....	15,624	16,454	
July	.....	3,604	.....	.....	.....	14,584	
August	.....	1,032	7,199	.....	14,012	19,772	
September ...	972	10,608	7,680	3,470	9,840	17,918	
October	1,828	3,236	3,888	8,556	7,826	8,468	
November ...	.....	4,688	4,641	4,680	4,740	4,704	
December ...	.....	2,534	2,767	2,700	2,790	2,790	
		47,906	53,049	45,436	81,946	111,816	

Summary of Estimates of Available Storage at Lake Cheesman.

	Field, ac. feet.	Fellows, ac. feet.	Bull, ac. ft.	Anderson, ac. feet.	Comstock, ac. feet.
1900	.....	126,188	.....	169,578	.....
1901	.....	48,458	63,220	66,182	.....
1902	11,882	12,942	8,340	10,962	15,876
1903	19,336	12,563	15,290	16,108	38,862
1904	24,639	25,330	38,210	37,968	59,166
1905	78,490	68,133	83,640	92,342	92,618
1906	70,712	66,804	75,960	78,282	103,366
1907	76,104	79,516	138,150	101,622	153,360
1908	11,390	15,091	10,590	14,112	24,174
1909	133,282	130,070	187,912	206,138	196,698
1910	47,408	49,979	41,520	50,000	73,800
1911	9,830	12,296	9,690	29,554	53,392
1912	76,876	87,999	153,370	154,286	143,638
1913	47,906	53,049	45,436	81,946	111,816
Average for:					
(1900-13) 14 years	.....	56,316	.....	79,220	.....
(1901-13) 13 "	.....	50,941	67,056	72,269	.....
(1902-13) 12 "	50,655	51,148	67,376	72,777	88,897
Average of Estimates limited to capacity of 79,064 acre feet.					
Average for:					
('00-13) 14 years	.....	48,636	.....	55,539	.....
('01-13) 13 "	.....	46,295	48,391	53,730	.....
('02-13) 12 "	46,137	46,115	47,156	52,692	61,638

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Add full capacity of 1900 and 1914 to all estimates for 12 years (excluding 1901).					
Average for: 14 years.....	50,840	50,822	51,714	56,459	64,127
Add full capacity of 1900 and 1914 to all estimates for 13 years (including 1901).					
Average for: 15 years.....	.....	50,664	52,481	57,108	.....
Anderson's average: (16 years—1899-1914 inclusive).....	.....	.....	.....	58,480	.....

1286 (Endorsed:) 6214. U. S. District Court, district of Colorado. Plaintiff's Exhibit A-88. Filed Oct. 6, 1915. Charles W. Bishop, Clerk.

PLAINTIFF'S EXHIBIT No. —.

Case No. —.

COMPLAINANT'S EXHIBIT No. A-92.

Tabulation of Estimates of Available Storage Corrected for Platte Canon Ditch and Evaporation at Lake Cheesman.

Month.	Actual storage, ac. ft.	Field, ac. ft.	Fellows, ac. ft.	Bull, ac. ft.	Anderson, ac. ft.	Comstock, ac. ft.
1900. January	.....	.....	1,600	.....	1,612	1,618
February	.....	.....	1,500	.....	1,512	1,512
March	.....	.....	4,920	.....	4,960	4,956
April	.....	.....	15,120	.....	15,240	15,243
May	.....	.....	60,650	.....	61,194	.....
June	.....	.....	37,994	.....	72,240	.....
July	.....	.....	.....	.....	1,426	.....
August	.....	.....	.....	.....	.....	.....
September	.....	.....	.....	.....	.....	.....
October	.....	.....	.....	.....	5,208	.....
November	.....	.....	4,050	.....	4,140	.....
December	.....	.....	2,040	.....	2,046	.....
	.....	.....	127,874	.....	169,578	.....
1901. January	.....	.....	866	.....	893	868
February	.....	.....	838	.....	842	840

	March	.....	.....	4,139	.....	4,173	4,154
	April	536	.....	11,817	.....	11,923	11,880
	May	2,760	.....	19,989	.....	14,833	13,826
	June	3,037	.....	.....	.....	9,482	7,320
	July	536	.....	.....	.....	.....	186
	August	.....	.....	.....	.....	6,095	9,300
	September	.....	.....	.....	.....	.....	4,500
	October	.....	.....	.....	.....	3,658	1,612
	November	.....	.....	6,248	.....	6,285	6,240
	December	.....	.....	5,401	.....	5,449	5,456
			.....	49,298	.....	63,633	66,182
1289							
1902.	January	.....	3,868	3,852	3,852	3,844	3,826
	February	.....	1,140	1,105	1,095	984	1,090
	March	.....	2,572	2,573	2,536	2,542	2,520
	April	1,473	6,004	5,935	.....	780	5,896
	May	.....	.....	.....	.....	.....	498
	June	.....	.....	.....	.....	.....	.....
	July	.....	.....	.....	.....	.....	.....
	August	.....	.....	.....	.....	.....	.....
	September	.....	.....	.....	.....	.....	.....
	October	740	.....	.....	.....	744	2
	November	772	1,250	1,266	.....	1,200	1,178
	December	.....	918	909	933	868	866
			15,752	15,640	8,416	10,962	15,876

	Month.	Actual storage, ac. ft.	Field, ac. ft.	Fellows, ac. ft.	Bull, ac. ft.	Anderson, ac. ft.	Comstock, ac. ft.
1903.	January	.....	578	599	575	558	530
	February	.....	264	270	234	224	216
	March	2,540	2,853	2,818	2,815	2,790	2,802
	April	5,369	5,370	6,317	5,310	5,400	6,258
	May	854	.....	.....	.....	806	354
	June	2,464	8,620	.....	2,215	1,800	18,492
	July	.....	.....	.....	.....	.....	1,090
	August	.....	.....	.....	.....	.....	210
	September	.....	.....	.....	.....	.....	2,820
	October	.....	.....	.....	.....	.....	1,576
	November	.....	3,715	3,683	3,701	3,600	3,608
	December	.....	980	990	943	930	906
			22,380	14,677	15,793	16,108	38,862

1290

1904.	January	.....	288	313	256	248	218
	February	.....	448	425	394	348	368
	March	.....	2,760	2,723	2,705	2,666	2,676
	April	983	3,467	3,916	1,643	1,200	3,794
	May	5,394	5,497	3,231	5,211	5,580	8,260
	June	19,142	.....	.....	15,345	17,820	6,070
	July	3,009	523	.....	5,237	2,356	2,150
	August	.....	4,543	4,490	.....	.....	14,138
	September	.....	2,818	.....	1,000	780	7,440
	October	1,197	1,784	2,955	2,185	1,464	8,510

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	November	.....	.....	4,314	4,274	4,285	4,080	4,098
	December	.....	.....	1,603	1,560	1,510	1,426	1,444
				28,045	28,892	39,771	37,968	59,166
1905.	January	.....	.....	796	768	723	620	636
	February	.....	.....	1,226	1,194	1,088	1,008	1,032
	March	.....	.....	7,918	7,828	7,771	7,688	7,714
	April	.....	15,171	15,757	15,596	15,661	15,330	15,296
	May	.....	7,651	29,232	28,895	29,022	28,768	28,756
	June	.....	.....	20,298	12,045	25,528	24,900	24,454
	July	.....	.....	.....	.....	.....	.....	112
	August	.....	.....	.....	.....	.....	.....	314
	September	.....	.....	.....	.....	.....	4,500	4,832
	October	.....	.....	.....	.....	.....	4,216	4,156
	November	.....	.....	4,632	4,607	4,592	4,320	4,326
	December	.....	.....	1,208	1,184	1,086	992	990
				81,067	72,117	85,471	92,342	92,618
1291								
1906.	January	.....	.....	513	514	412	310	298
	February	.....	.....	629	646	447	392	372
	March	.....	2,883	3,818	3,764	3,638	3,534	3,558
	April	.....	.....	13,042	13,215	13,261	12,840	12,854
	May	.....	.....	16,832	16,670	16,700	15,500	16,408
	June	.....	.....	944	.....	5,238	.....	8,986
	July	.....	.....	.....	.....	.....	.....	6,962
	August	.....	.....	.....	.....	.....	.....	1,630

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	Month.	Actual storage, ac. ft.	Field. ac. ft.	Fellows, ac. ft.	Bull, ac. ft.	Anderson, ac. ft.	Comstock, ac. ft.
	September	.....	6,157	3,162	5,477	9,000	15,638
	October	.....	13,392	13,701	14,471	18,228	18,184
	November	.....	13,288	13,176	13,232	12,960	12,966
	December	.....	5,728	5,673	5,606	5,518	5,510
			74,343	70,521	78,482	78,282	103,333
1907.	January	.....	3,342	3,346	3,234	3,100	3,124
	February	.....	3,948	3,927	3,769	3,696	3,686
	March	.....	7,426	7,395	7,239	7,192	7,154
	April	.....	9,138	10,121	8,083	1,500	9,746
	May	.....	9,406	13,438	15,950	.....	14,706
	June	.....	14,656	10,493	30,548	21,000	29,924
	July	.....	17,858	17,850	41,988	24,800	41,660
	August	.....	6,798	10,317	20,747	24,800	20,630
	September	.....	1,658	.....	1,065	6,000	9,052
	October	1,779	.....	.....	2,697	3,720	7,878
	November	.....	4,442	4,429	4,402	4,140	4,136
	December	.....	1,872	1,860	1,746	1,674	1,654
			80,544	63,176	141,468	101,622	153,360
1292							
1908.	January	.....	831	822	733	620	614
	February	.....	759	777	598	522	500
	March	1,355	5,184	5,118	4,978	4,898	4,924

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	April	.....	1,940	7,086	.....	.....	6,632
	May	.....	.....	.....	.....	.....	.....
	June	.....	.....	.....	.....	.....	.....
	July	.....	.....	.....	.....	.....	.....
	August	.....	.....	.....	.....	.....	2,834
	September	.....	.....	.....	.....	.....	690
	October	.....	.....	.....	.....	3,534	3,454
	November	.....	3,604	3,594	3,573	3,360	3,356
	December	.....	1,350	1,334	1,269	1,178	1,170
			13,668	18,731	11,151	14,112	24,174
1909.	January	.....	1,174	1,157	1,114	992	994
	February	.....	1,254	1,271	1,155	1,064	1,038
	March	.....	2,805	2,801	2,676	2,644	2,588
	April	14,500	13,714	15,015	15,053	14,700	14,708
	May	4,531	3,339	4,755	11,565	11,160	10,716
	June	.....	7,962	.....	24,678	24,480	24,326
	July	.....	9,318	1,249	22,896	29,574	26,364
	August	.....	15,680	21,138	24,571	34,100	28,246
	September	.....	51,205	52,053	50,817	52,020	52,010
	October	.....	17,564	20,622	20,851	20,130	20,452
	November	.....	8,946	8,892	8,902	8,640	8,626
	December	.....	6,848	6,780	6,666	6,634	6,630
			139,809	135,733	191,144	206,138	196,698

Month.		Actual storage, ac. ft.	Field, ac. ft.	Fellows, ac. ft.	Bull, ac. ft.	Anderson, ac. ft.	Comstock, ac. ft.
1910.	January	.....	4,940	4,875	4,883	4,712	4,722
	February	.....	1,718	1,702	1,748	1,456	1,458
	March	.....	18,935	18,737	18,448	18,662	18,674
	April	.....	11,056	10,936	10,991	10,560	10,532
	May	.....	6,740	11,204	.....	4,464	16,302
	June	.....	.....	.....	.....	.....	3,826
	July	2,573	1,763	.....	.....	.....	3,998
	August	1,568	1,322	.....	.....	.....	4,830
	September	.....	.....	.....	.....	.....	.....
	October	.....	.....	.....	.....	4,030	3,850
	November	.....	4,149	4,641	4,648	4,380	3,860
	December	.....	1,954	1,968	1,821	1,736	1,748
			52,577	54,063	42,539	50,000	73,800
1911.	January	.....	963	930	785	744	760
	February	.....	1,374	1,349	1,192	1,120	1,134
	March	3,985	4,868	4,848	4,573	4,650	4,624
	April	.....	3,240	6,158	.....	.....	5,740
	May	.....	.....	.....	.....	.....	1,598
	June	4,912	.....	.....	.....	.....	6,740
	July	6,430	.....	.....	.....	17,484	22,352
	August	.....	.....	.....	.....	.....	178
	September	.....	.....	.....	.....	.....	2,320
	October	2,133	371	.....	.....	2,170	4,586

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	November	.....	2,807	2,824	2,740	2,580	2,550
	December	.....	989	962	949	806	810
			14,612	17,071	10,239	29,554	53,392
1294							
1912.	January	.....	828	843	740	682	654
	February	.....	987	1,006	831	812	784
	March	.....	2,162	2,167	2,041	1,984	1,960
	April	7,511	5,306	8,406	8,431	8,100	8,100
	May	11,030	7,792	11,932	11,857	11,718	10,532
	June	8,810	26,474	25,571	34,316	33,900	33,788
	July	.....	18,264	21,441	44,158	43,958	42,178
	August	.....	10,217	11,854	28,535	28,396	22,252
	September	.....	546	.....	8,990	8,700	7,420
	October	2,885	708	.....	7,033	8,386	6,370
	November	.....	8,374	8,340	8,300	8,100	8,070
	December	.....	1,746	1,733	1,645	1,550	1,530
			83,404	93,293	156,877	154,286	143,638
1913.	January	.....	990	1,002	885	806	778
	February	.....	856	861	686	616	606
	March	.....	1,441	1,417	910	1,178	1,192
	April	5,763	15,564	16,358	15,641	16,020	16,036
	May	.....	4,630	8,800	8,774	8,494	8,514
	June	.....	972	.....	.....	15,624	16,454
	July	.....	4,073	.....	.....	.....	14,584

	Field, ac. ft.	Fellows. ac. ft.	Bull, ac. ft.		Anderson. ac. ft.	Comstock, ac. ft.
August	972	1,506	7,673	.....	14,012	19,772
September	1,828	11,030	8,127	3,757	9,840	17,918
October	.....	3,586	4,220	8,827	7,826	8,468
November	.....	5,010	4,964	4,942	4,740	4,704
December	.....	3,006	2,966	2,795	2,790	2,790
		52,664	56,388	47,217	81,946	111,816

1295

Summary.

1900	.....	127,874	.....	169,578	.....
1901	.....	49,298	63,633	66,182	.....
1902	15,640	15,640	8,416	10,962	15,876
1903	22,380	14,677	15,793	16,108	38,862
1904	28,045	28,892	39,771	37,968	59,168
1905	81,067	72,117	85,471	92,342	92,618
1906	74,343	70,521	78,482	78,262	103,366
1907	80,544	83,176	141,468	101,622	153,360
1908	13,668	18,731	11,151	14,112	24,174
1909	139,809	135,733	191,144	206,138	196,698
1910	52,577	54,063	42,539	50,000	73,800
1911	14,612	17,071	10,239	29,554	53,392
1912	83,364	93,293	156,877	154,286	143,638
1913	52,664	56,388	47,292	81,946	111,816

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Average for:					
(1900–13) 14 years	.....	59,819	.....	79,220	.....
(1901–13) 13 "	.....	54,585	68,637	72,269	.....
(1902–13) 12 "	54,902	55,025	69,054	72,777	88,897

Average of Estimates limited to capacity of 79,064 acre feet.

Average for:					
(1900–13) 14 years	.....	50,975	.....	55,539	.....
(1901–13) 13 "	.....	48,815	48,736	53,730	.....
(1902–13) 12 "	49,192	48,774	47,495	52,692	61,638

Add full capacity of 1900 and 1914 to all estimates for 12 years (excluding 1901).

Average for:					
14 years	53,459	53,101	52,005	56,459	64,127

Add full capacity of 1900 and 1914 to all estimates for 13 years (including 1901).

Average for:					
15 years	.....	52,848	52,780	57,108	.....

Anderson's average:					
(16 years—1899–1914 inclusive)	.....	.....	.....	58,480	

(Endorsed:) 6274. U. S. District Court, District of Colorado. Plaintiff's Exhibit A-92. Filed Oct. 6, 1915. Charles W. Bishop, Clerk.

PLAINTIFF'S EXHIBIT No. A-96.

Case No. —.

Complainant's Exhibit No. A-96.

Final Summary of Estimates of Available Storage in Lake Cheesman.

	Field, ac. feet.	Fellows, ac. feet.	Bull, ac. ft.	Anderson, ac. ft.	Comstock, ac. ft.
Average for 14 years	53,459	53,101	52,005	56,459	64,127
Add for actual storage	2,852	3,184	1,879	.....	.....
Add for Antero Reservoir	1,750	1,750	1,750	.....	.....
	58,061	58,035	55,634	56,459	64,127
Average for 15 years	.....	52,848	52,780	57,108	.....
Add for actual storage	.....	2,972	1,754	.....	.....
Add for Antero Reservoir	.....	1,633	1,633	.....	.....
		57,453	56,167	57,108	
Excess of Estimated Storage over Anderson	2,662	2,792	.....	.....	
Anderson's Estimate for 16 years	.....	.....	.....	58,480	

(Endorsed:) 6274. U. S. District Court, District of Colorado. Plaintiff's Exhibit A-96. Filed Oct. 6, 1915. Charles W. Bishop, Clerk.

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1297 Case No. —.

COMPLAINANT'S EXHIBIT No. A-97.

Table Showing Amount of Water Available for Storage in Lake Marston Not Credited in Total under Items 1, 2, 3, 4, 15, 16, *and* 17, *Which Could be Stored in Lake Cheesman.*

May, 1901	1,153	acre-feet
April and May, 1902	1,947	" "
April and May, 1903	1,947	" "
April and May, 1904	1,947	" "
May, 1906	1,153	" "
April and May, 1907	1,947	" "
April and May, 1908	1,947	" "
May, 1910	1,153	" "
April and May, 1911	1,947	" "
May, 1913	1,153	" "
Total	16,294	acre-feet

For the 16-year period, from 1899 to 1914 inclusive, this would represent an annual addition to available storage of 1,018 acre feet.

(Endorsed:) 6274. U. S. District Court, District of Colorado. Plaintiff's Exhibit A-97. Filed Oct. 6, 1915. Charles W. Bishop, Clerk.

(Here follows tabular statement, marked page 1298.)

1299 PLAINTIFF'S EXHIBIT —, TABLES A TO H.

Court.

Leonard Metcalf in Rebuttal.

The Denver Union Water Company Rating Case as of May 1, 1914.

Case No. —.

COMPLAINANT'S EXHIBIT No. A-99 M.

Original Costs and Comparison of Testimony of Witnesses.

Table A. Cast iron pipe and specials.
" B. Cement.
" C. Cheesman Dam, Geddis & Seerie Contract (CC).
" D. Concrete Reservoir Slope Paving.
" E. New Wooden Roof upon Ashland Reservoir.
" F. Comparison Estimates on Wooden Reservoir Roof.
" G. Capitol Hill Reservoir # 2 (2).
" H. Motor truck transportation in California on Spring Valley Water Company and Los Angeles Water Works Construction.

1300 Jan. 12, 1915.—L. M.

PLAINTIFF'S EXHIBIT —, TABLES A TO H.

Leonard Metcalf in Rebuttal.

The Denver Union Water Company Rating Case as of May 1, 1914.

Original Costs and Comparison of Testimony of Witnesses.

Table A. Cast Iron Pipe and Specials.
" B. Cement.
" C. Cheesman Dam, Geddis & Seerie Contract (CC).
" D. Concrete Reservoir Slope Paving.
" E. New Wooden Roof upon Ashland Reservoir.
" F. Comparison Estimates on Wooden Reservoir Roof.
" G. Capitol Hill Reservoir # 2 (2).
" H. Motor Truck Transportation in California on Spring Valley Water Company and Los Angeles Water Works Construction.

Prices Paid for Cast-iron Pipe by the Denver Union Water Company, F. O. B. Cars Denver, Per Ton of 2,000#. Contracts Let After Competitive Bidding.

Dec. 11, 1914.—L. M.

Cast-iron Pipe and Specials, F. O. B. Denver.

Year.	6-inch.		12-inch.		Average of all diameters.	
	Tons.	Price per ton.	Tons.	Price per ton.	Tons.	Average price p. ton.
1904	.....	.....	14.97	$30	429.89	$30
1905	560.59	$30	200.19	30	905.13	30.90
1906	275.07	34	591.20	36.50	1,355.24	34.60
1907	303.41	39	1,497.99	39.90	2,657.27	40.20
1908	137.46	30	.....	.....	187.17	30.80
1909	147.43	29.50	.....	.....	155.05	29.55
1910	482.52	30	537.89	31	1,362.96	30.50
1911	578.95	30	880.83	29	1,634.06	29.45
1912	588.84	30	437.13	30	1,025.97	29.90
9 mos. 1913	537.33	30	135.27	30	879.54	30.60
Total	3,611.60	$112,106	4,295.47	$147,195	10,592.28	$352,371
Average		$31.40		$32.05		$33.27
1913	528	$30.30	603	$32	1,406	$31.39
1914	9.5	28.80	...	...	91.5	$29.01

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***Prices** Paid for Cast-iron Specials by the Denver Union Water Company F. O. B. Cars Denver, Per Pound and Per Ton of 2,000#. Contracts Let After Competitive Bidding.*

Year.	Cents per pound.	Dollars per ton.
1904	3¢ to 3¼	$60 to $65
1905		
1906	3¢ to 5¢	60 to 100
1907	3⅜¢ to 4⅜¢	67.50 to 87.50
1908		
1909		
1910	3¢ to 3¼¢	60 to 65
1911	3¼¢ to 3½¢	65 to 70
1912	3¾¢ to 4¢	75 to 80
9 mos. 1913	3¼¢ to 4¢	65 to 80
Averages	3.232¢ to 3.911¢	$64.64 to
	3.911¢	$78.22 say 3½¢ = $70 p. ton
1913	3.1¢	$62.18
1914	3.33¢	$66.53

1302 PLAINTIFF'S EXHIBIT —. TABLE B. METCALF.

Jan. 7th, 1915.—L. M.

Cement Costs, f. o. b. Cars Denver. Metcalf in Rebuttal.

Cost of Portland Cement, f. o. b. Cars Denver, Bought by the Denver Union Water Company, Accepting the Lowest Bidder on Competitive Bidding, with Deduction for Returned Sacks.

NOTE.—This record includes all records concerning any substantial purchases by the Company.

Year.	Barrels.	Brand.	Cost per barrel f. o. b. cars.	Amount.
1905	6,000	Iola	$1.85	$11,100
1906	10,312	"	2.00	20,624
1907	6,140	"	2.30	14,122
1908 } 1909 } 1910	none	.....	.....	.....
1911	3,000	Iola	1.20*	3,600
1912	2,000	Colorado	1.17*	2,340
1913	482	Iola	1.97	950
1914	408	Colorado	2.02	898
	28,342	Average.....	($1.89)	$53,634

*Prices abnormal on account of disastrous competition.

It is probably fair to assume a credit per barrel for sacks returned, of.....	0.25
Net cost..... excluding handling, storage, and testing	$1.64

Metcalf & Anderson Pl. Exh. C:

Cement per bbl. f. o. b. cars Denver.....	$2.00
Deduct credit upon bags.....	0.25
Net price per barrel.....	$1.75
Storage and handling into storehouse, testing, etc.....	0.15
Cost per bbl. ready for delivery on site work.....	$1.90

John Gaffy Def. Exh. 58, p. 11:

Cost of cement f. o. b. Denver	$1.62
Handling once in storehouse	.04
(Gaffy allows three handlings from cars to work @ 60¢ per ton.)	$1.66
Profit, 12%	.20
	$1.86
Contractor's bond, insurance & interest, 3.52%	.07
Cost per bbl. on teams or in storehouse	$1.93

Ackert Bickel:

Bickel in cross examination said that he estimated the fair cost of cement f. o. b. Denver, at	$1.37
and in submitting his total cost of the "Capitol Hill Concrete Costs" used as the price of the cement delivered on the work	$1.52

per barrel, to which he applied a 25% contractor's overhead and profit allowance.

Edmund C. Van Diest

of the Public Utilities Engineers did not submit in his exhibits detailed figures showing their assumption as to the cost of cement.

(Here follows tabular statement, marked page 1303.)

Dec. 8, 1914.—L. M.

Copy.

Cheesman Lake Dam Masonry Contract Excluding Work Done by Company.

The South Platte Canal and Reservoir Company.

Estimate No. 49 Final.

Denver, Colo., October 1, 1904.

Estimate of the Amount and Value of the Work Done to Date under Contract of the Geddis and Seerie Stone Company, Dated August 29, 1900, *and under Supplemental Agreement Thereto, Dated October* 26, 1903, *for Building the Masonry Dam at Lake Cheesman, Colorado.*

Items.	Description.	Oct. quan.	Previous quantities.	Total quantities.	Contract price.	Amount.
	Main dam below elev. 210′:					
1	Cu. yds. excavation	.....	16,825.83	16,825.83	$1.00	$16,825.83
2	" " stone masonry	.....	93,203.05	93,203.05	4.10	382,132.50
	Main dam above elev. 210′:					
*a*1	Cu. yds. excavation	10.19	117.05	1,127.24	1.00	1,127.24
*a*2	" " stone masonry	.....	3,033.33	3,033.33	5.50	16,683.32
	Part of dam between main dam and spillway:					
*b*1	Cu. yds. excavation	.....	1,834.91	1,834.91	1.25	2,293.64
*b*2	" " stone masonry	.....	1,657.19	1,657.19	5.50	9,114.55

	Masonry parapet walls:				
*c*1s	Cu. yds. excavation		(Included in *a*1)	1.00	
*c*1n	" " "		(Included in *b*1)	1.25	
*c*2	" " stone masonry	553.34	553.34	20.00	11,066.80
	Spillway:				
*d*1	Cu. yds. excavation	9,922.13	9,922.13	1.25	12,402.66
*d*1ad	Refilling trenches, embanking & grading	.....	.....	300.00	300.00
*d*2	Cu. yds. stone masonry	4,450.46	4,450.46	5.50	24,477.53
	Concrete roadway on top of spillway and dam:				
*e*1	Sq. ft. finished roadway	196.76	196.76	0.08	1,574.08
	Total				$477,998.15

NOTE.—Owing to increase in labor and liability, etc., M. & A. increased these figures slightly. 9.3%.

Mr. Hawes tells me that "in looking over the monthly estimates for Lake Cheesman dam I find that the Company paid the following for extras plus 15%:

Drilling	25¢ per hour.
Teaming	50¢ and 55¢ per hour.
Blacksmith	50¢ per hour.
Blacksmith helper	27½¢ per hour.
Labor	25¢ per hour.

"I called Mr. Geddis up and he states they worked 10 hours per day and paid masons from $2.50 to $7.50 per day.—W. F. Hawes."

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PLAINTIFF'S EXHIBIT —, TABLE E, LEONARD METCALF.

The Denver Union Water Company.

Fair Contract Cost of Reservoir Concrete Slope Paving.

Concrete Slope Paving or Lining.

Metcalf in Rebuttal.

Dec. 16th, 1914.—L. M.

Revised Jan. 6th, 1915.—L. M.

Authority and reference.	Location.	Quantity (all 6" thick).	Rate.	Amount.
	Class F, So. Platte.			
M. & A. Pl. Exh. C. p. 174, Item 8G...	Slow Sand Filters.....	9,715 c. y.	$6.50	$63,148
	Class O, Capitol Hill.			
" " p. 334, " 4G...	West Reservoir	1,520 c. y.	10.37	15,730
" " p. 335, " 5G...	East Reservoir	4,780 c. y.	10.34	54,238
(Including approx. 15% contractor's profit.).....		16,015 c. y.		$133,116
	Class O, Capitol Hill.			
Van Diest Def. Exh. 54-19 Sheet 7....	West Reservoir	Combined amounts.		$24,836
(Inc. 15% contractor's profit.).....	East Reservoir			

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THE DENVER UNION WATER COMPANY.

			Class F, South Platte.			
Gaffy's Def. Exh. 57 p. 30, Item 8G...			Slow Sand Filters.....	9,715 c. y.	$6.64*	$57,827*
			Class O, Capitol Hill.			
"	"	p. 105, " 4G...	West Reservoir	1,520 c. y.	8.20	12,468*
"	"	p. 107, " 5G...	East Reservoir	4,780 c. y.	10.02	47,930*
(Inc. 15.92% entire contractor's overhead and profit).....				16,015 c. y.		$118,225*
			Class F, So. Platte.			
Bickel Def. Exh. 65 p. 14, Item 8G...			Slow Sand Filters.....	.....	$8.18*	$71,300**
			Class O, Capitol Hill.			
"	"	p. 52, " 4G...	West Reservoir	.....	7.25**	11,030**
"	"	p. 53, " 4G...	East Reservoir	.....	7.25**	34,700**
(Including 26.12% entire contractor's overhead and profit).....						$117,030**
Actual cost recent (1914).....			West Basin of Ashland Reservoir.	425.7 c. y.	$11.01 excluding overhead 12.11 inc. 10% " 13.21 " 20% "	

* Including Gaffy's revised allowance of 3.52% (additional) to cover contractor's bond, insurance and interest, being Gaffy's Def. Exh. 57, figures x 1.0352.

** Including Bickel's allowance for contractor's contingencies 4.46%, being Bickel's Def. Exh. 65 figures x 1.0446.

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PLAINTIFF'S EXHIBIT —, TABLE F, METCALF.

Cost of New Wooden Roof on Ashland Reservoir.

Summary of Cost of the New Wooden Roof on West Basin of the Ashland Reservoir, Built by The Denver Union Water Company, Cost Excluding Any Allowance for Administration, Engineering, Interest During Construction or profit, and Excluding Cost of Removing the Old Structure.

Jan. 7th, 1915.—L. M.
Metcalf in Rebuttal.

Period of Construction, clearing out old structure, from March 19th to April 30th, 1914..... 43 days
Building new structure, May 1st to July 10th, 1914..... 41 "
1,455 c. y. excavation, backfilling and cleaning up, $1,839.11 ..... $1.26 per cubic yard

425.7 c. y. concrete 1:2½:5		Per c. y.
Cement	$893.52	$2.10
Sand	1,083,87	2.54
Forms	1,746.63	4.10
Mixing & Placing.....	961.38	2.26
Total.....	$4,685.40	$11.01
Roofing Material—Lumber 393,731′ b. m...		$10,032.00
Nails		179.64
Miscellaneous		111.73
Total.....		$10,323.37
Labor		4,819.11
Total, Materials and Labor.....		$15,142.48
Unit cost		3.84¢ per ft. b. m.

If 15% overhead or contractor's profit be added, this would be equivalent to.....4.42¢ per ft. b. m.

Fencing, 1120′ b. m. $103.11.....9.2¢ per ft. b. m.

NOTE.—The total amount, $21,770.10, exclusive of overhead charges, agrees with the Company's book account, which follows:

Lumber:		
Purchased	416,751 ft.	$10,593.57
Surplus returned to stores	21,900 "	530.21
Net amount used	394,851 ft.	$10,063.36
Labor		9,278.30
Sand		1,083.87
Miscellaneous material and expense		1,344.57
Total		$21,770.10

PLAINTIFF'S EXHIBIT —, TABLE F.—(Continued).

Fair Contract Cost of Wooden Reservoir Roofs.
(Metcalf.)

The Denver Union Water Company, Rating Case (May 1, 1914).

Metcalf in Rebuttal.

Jan. 6, 1915.—L. M.

Jan. 6, 1915.—L. M.

Estimators.	West Denver Reservoir Roof, Class N.	Capitol Hill Reservoir Roofs, Class O.		Ashland Reservoir Roofs, Class P.		Average contract cost per ft. B. M. including contractor's profit, etc.	Total amount (estimated).
		West Basin No. 1.	East Basin No. 2.	West Basin.	East Basin.		
Columns (1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
On Basis of Cost of Building Ashland Reservoir New Roof May 1, to July 10, 1914. Excluding cost of clearing away old structure.							
Without allowance for overhead or profit.....						3.84¢	$69,850
With 15% allowance for overhead costs.....						4.42¢	80,400
Metcalf and Anderson..... Plaintiff's Exhibit C. N–p. 315—Item 4 F—334,000 ft.B.M. O–p. 334—Item 4 H—255,000 ft.B.M. p. 335—Item 5 H—693,000 ft.B.M. P–p. 348—Item 3A1—337,000 ft.B.M. p. 348—Item 3A2—300,000 ft.B.M. Total..... 1,819,000 ft.B.M.	$9,360	$8,843	$27,236	$13,496	$12,000	3.90¢	$70,935

Public Utilities Engineers..... By Van Diest-Brown.	$10,500	$7,746	$22,305	$13,756	$13,321	3.73¢	$67,688
John Gaffy, Def. Exh. 57 with Gaffy's 3.52% added to cover contractor's bond, ins. and int.....	$8,721	$5,995	$21,837	$14,790	$11,828	3.82¢	$63,171
N–p. 98—Item 4 F—234,000 ft.B.M.			On M. & A. Quantities....			3.48¢	
O–p. 105—Item 4 H—156,500 ft.B.M.							
p. 108—Item 5 H—570,120 ft.B.M.							
P–p. 117—Item 3A1—386,170 ft.B.M.							
p. 117—Item 3A2—308,800 ft.B.M.							
Total..... 1,655,590 ft.B.M.							
Ackert Bickel Testimony*.....	$9,686	$9,754.1	$28,686	$14,015	$12,477	4.10¢	$74,610

* Including 25% Overhead & profit plus 4.46% contingencies thereon (Bickel).

Cost of Wooden Reservoir Roofs.
Metcalf in Rebuttal.

(Here follows tabular statement, marked page 1308.)

The Den

Jan. 6, 1915. L. M.

Rat

Comparative Analysis of Estimates of Fa
Excluding Company's Overh

Authority.

Column (1)

1. Actual Cost to Company, excluding Overhead, costs, Administration Engineering, Interest, etc. Years 1906 and 1907 (with $807.46 betterments in 1911) .....
2. Metcalf and Anderson, Pla-ntiff's Exhibit C, pp. 333-338. Fair Contract Cost excluding Company's overhead, engineering, Administration, interest, etc. .....
3. Public Utilities Engineers by Van Diest in Testimony (Blueprint) Excluding 5% Engineering and overall, Interest 3% on Excavation, etc., 2% on Lining but including 15% Contractor's profit, and overhead, as per Defendants' Exhibit 54-19—sheet 7.

$\frac{115\%}{123.6\%} = 93.0\%$ and $\frac{115.\%}{122.4\%} = 94.0\%$ respectively.

Items (*a*) Fencing $810 plus 15% Contractor's Profit.
(*b*) $2,060 plus 15% Contractor's Profit.
(*c*) Including "Drainage $2,271" plus 15% Contractor's Profit.

Are from Public Utilities Engineers' Report.

4. John Gaffy, Defendants' Exh. 57 & 58 including (12%) Contractor's overhead & profit and 3.52% thereon for Contractor's Bond, Ins., & interest, making total 15.92% (Gaffy) on basic cost—Fair Contract Cost .....
5. Ackert Bickel, Defendants' Exhibit 65, pp. 52—Fair Contract Cost including 25% Contractor's overhead and profit, etc., plus*** .....

[Endorsed:] Capitol Hill Reservoir #2. (East.) Metcalf in Rebuttal.

***4.46% over-all contractor's contingencies.

**It is impossible to segregate these items and this amount may

HIBIT —. TABLE G. LEONARD METCALF.

Denver Union Water Company. Capitol Hill Reservoir #2. (East.)
Metcalf in Rebuttal.

Rating Case, May 1, 1914.

Fair Contract Cost Now of Capitol Hill Reservoir #2. (East.)
rhead, Administration, Engineering, Interest, etc.

Roads, sodding, seeding, fencing.	Retaining wall.	Earth and rock excavation, excess haul embankment.	Concrete lining, 600 ft. drain.	Wooden cover.	Pipe, valves, specials, sub- and superstructures of vaults, gate houses, etc., miscellaneous.	Total of reservoir #2.
(2)	(3)	(4)	(5)	(6)	(7)	(8)
$1,540	$3,874	$53,192	$59,932	$25,243	$25,424**	$169,205**
2,243	1,991	52,116	54,358	27,236	13,394	151,338
932(?) (*a*)	2,330(?) (*b*)	23,836	24,848	30,224	11,819(?) (*c*)	91,989
2,322	2,000	40,207	42,184	21,837	14,902	123,452
2,290	1,860	33,650	34,830	28,680	14,040	115,340

y not be comparable with the corresponding amounts of witnesses.

G 2.

The Denver Union Water Company.

Statement of Cost of Construction of Capitol Hill Reservoir No. 2.

(Excluding Overhead Charges.)

	Year ended—			Total.
	Oct. 31, 1906.	Oct. 31, 1907.	Oct. 31, 1911.	
Soil Dressing and Seeding	.....	$557.37	.....	$557.37
Fencing Reservoir	.....	983.00	.....	983.00
Retaining Wall	$503.73	3,370.75	.....	3,874.48
Earth Excavation and Embankments	$48,651.75	$4,499.77	.....	$53,151.52
Rock Excavation	34.10	.....	.....	34.10
Puddle	5.53	.65	.....	6.18
Concrete	33,080.26	26,851.28	.....	59,931.54
Roof and Supports	5,739.07	19,504.37	.....	25,243.44
Pipes, Valves and Specials	7,170.52	10,984.34	.....	18,154.86
Miscellaneous	2,519.45	2,952.75	.....	5,472.20
Valve Chamber & Superstructure	205.40	783.65	.....	989.05
Well house and Miscellaneous—Betterments	.....	.....	$807.46	807.46
Total	$97,909.81	$70,487.93	$807.46	$169,205.20
Engineering & Superintendence. Excluding overhead charges	3,748.65	2,106.37	.....	5,855.02
	$101,658.46	$72,594.30	$807.46	$175,060.22

1310 Jan. 16, 1915.

PLAINTIFF'S EXHIBIT A-99, TABLE H.

Leonard Metcalf in Rebuttal.

The Denver Union Water Company Rating Case as of May 1, 1914.

Transportation by Motor Trucks.

In connection with the investigation of the value of The Spring Valley Water Company, which supplies the City of San Francisco with water, Metcalf had occasion to look up the cost of transportation by motor trucks in that vicinity. He found that motor trucks were being used in the transportation of the cement from Milpitas, a small town on the railroad upon the east side of the San Francisco Bay, to the site of the Calaveras Dam under construction by The Spring Valley Water Company, a distance of approximately nine and one-half miles. The contract cost for this work was 28¢ per ton mile, the contractor loading his truck from the cars, the Company unloading the cement from the truck into its store-houses. The cost to unload amounted to approximately 27½¢ per ton. The road conditions were reasonably good, there being but one short stiff pitch in the entire distance, the work being done in the summer season. One truck made the round trip of nineteen miles in five hours, or four and one-half hours of travel and one-half hour of loading and unloading. With a view of reducing the overhead costs, the contractor hauled cement by night as well as by day. This necessitated the use of eight trucks to keep five trucks going in serviceable condition, there being insufficient time between trips to make the necessary repairs.

The hauling costs upon lumber and all other materials was 30¢ per ton mile plus 25¢ per ton for loading, the Company in these cases also unloading the material. The time lost in loading and unloading these materials was one hour per trip. Over 100,000 sacks of cement were hauled in this way.

Inquiry was also made of the conditions in Los Angeles and figures were obtained during the investigation by Metcalf upon the cost of this work to the City in 1912, the figures being 65¢ per ton for the first mile, 15¢ per ton each for the second and third mile, and additional miles at 10¢ per ton mile. Metcalf's recollection is not clear with regard to the limit of the distance to which the latter figures applied, but he remembers it as applying to hauls within the city limits and not to great distances.

(Endorsed:) 6274. U. S. District Court, district of Colorado. Plaintiff's Exhibit A-99. Filed Oct. 6, 1915. Charles W. Bishop, Clerk.

1311 PLAINTIFF'S EXHIBIT —, TABLES A TO B.

Leonard Metcalf in Rebuttal.

The Denver Union Water Company. Rating Case as of May 1, 1914.

Comparison of Estimates on Class S, Distribution Pipe System.

Case No. —.
Complainant's exhibit No. A-100.

1312 PLAINTIFF'S EXHIBIT —, TABLES A TO B.

Jan. 13, 1915—L. M.

Leonard Metcalf in Rebuttal.

The Denver Union Water Company. Rating Case as of May 1, 1914.

Comparison of Estimates on Class S, Distribution Pipe System.

Table A. Summary.
Table B. 1-2-3 Details of Public Utilities Engineers' Estimates.

(Here follows tabular statement, marked page 1313.)

1314 PLAINTIFF'S EXHIBIT —, TABLE B METCALF.

Jan. 7th, 1915—L. M.

Analysis Distri. Pipe System of the Public Utilities Engineers. Metcalf in Rebuttal.

The Denver Union Water Company. Rating Case as of May 1, 1914.

Mr. Edmund C. Van Diest of the Public Utilities Engineers submitted in Def. Exh. 54-19, sheet 11, estimate showing "Replacement Cost" and "Contractor's Profit 15% of the "General Schedule" of the distribution pipe system, "valve pits, river and bridge crossings, 24 inch (2552 feet) wood stave pipe, 24 inch (2582 feet) steel pipe," having previously submitted in Def. Exh. 28 their estimated replacement cost of the main items entering into the "General Schedule," (which latter (Def. Exh. 28) excluded contractor's profit in the specific items, although it added this overhead charge in a lump sum at the end) and gave under cross examination the allowance made by the Board upon the cast iron pipe, (to-wit: 3″ and 4″ diameter, $32.75 per ton delivered; 6″ to 16″ inclusive, $31.75 per ton delivered; 18″ and above, $31.50 per ton delivered.)

From the latter figures, Metcalf computed the following:

Public Utilities Engineers' Estimate of Cost of Cast Iron Pipe Delivered on Trench, Excluding Contractor's Overhead and Profit (15%).

Diameter of pipe.	Tons of pipe.	Price per ton.	Amount.
3″	86.126	$32.75	$2,821
4″	2,569.172	"	84,140
6″	20,156.307	31.75	639,963
8″	4,315.090	"	137,004
10″	2,522.685	"	80,095
12″	13,509.596	"	428,930
14″	1,734.454	"	55,069
15″	351.471	"	11,159
16″	4,115.125	"	130,655
18″	1,374.600	31.50	43,300
20″	1,167.250	"	36,768
24″	7,606.747	"	239,613
Total ...	59,508.623 Tons		$1,889,517
30″ Capitol Hill line Def. Exh. 54-19, Sheet 9, Item E-D-6 ...	928.2405 "	32.50	30,168
	60,436.8635 Tons		$1,919,685

Deduction:		
24″ West Alameda 2552′ @ 233.3# @ $31.50 p. ton	$9,377.	.....
24″ So. Clarkson 2582′ @ 233.3# @ $31.50 p. ton	9,488.	18,865
		$1,900,820
Add 15% contractor's profit		285,123
		$2,185,943

To the amount of the specials ($90,992) shown on the last page of Def. Exh. 28, was added the 15% contractor's profit, giving $104,641.

To the items "Valves and valve boxes" ($216,358.73) and "Smith specials" ($1,781.44) shown in Def. Exh. 28, was added the item "Valve pits" shown in Def. Exh. 54-19, sheet 11, ($4,597.29), with 15% contractor's profit upon all of these items, giving the total sum of $256,149.

1315 PL. EXH. —, B 2.

Jan. 7th, 1915—L. M.

Analysis Distri. Pipe System of the Public Utilities Engineers. Metcalf in Rebuttal—Continued.

The hydrant item, $146,542, Def. Exh. 28, was increased by the 15% contractor's profit, giving $168,523.

The derivation of the items "Excavation and Backfilling" $383,160 and "Pipe Laying, Labor, Lead and Yarn," ($306,347) both including 15% contractor's profit, is discussed in Metcalf's rebuttal exhibits relating to these subjects.

The item "Sheeting and Bracing" was derived from Def. Exh. 28, under the tabulation "Cost of Trenching and Backfilling," which tabulation does not include the 15% contractor's profit, which was subsequently added giving a total sum of $21,773.

The item "Pavements" was derived from the statement contained at the foot of Def. Exh. 54-25, page 6, "In the valuation of the engineers of the Public Utilities Commission, there was included for paving over mains, including engineering, contractor's profits, contingencies and interest during construction, $504,310.66." This amount, if figured in accordance with Van Diest's statement contained in Def. Exh. 54-19, sheet 11, must have been based upon replacement cost, 100%, plus contractor's profit 15%, plus engineering 10%, total 125%, plus interest during construction @ 8.4% thereon, or 10.5%, giving a grand total of 135.5% of the "replacement cost." From this should be made deduction for depreciation, which presumably amounted to 12.91%, as shown in Def. Exh. 54-19, sheet 11, which would make the net present value 135.5%

x 87.09%, equal to 118% of replacement cost. For the purpose of the present comparison, the "replacement cost" plus Van Diest's 15% contractor's profit is desired, which would therefore amount to 115%

118%, or 97.5% of $504,311, equal to approximately $491,700.

To the "River and Bridge Crossings" item, ($12,435.18), shown in Def. Exh. 54-19, sheet 11, was added the contractor's profit of 15%, giving a total of approximately $14,300.

The item "Obstructions, Railroad, Electric, Telephone, etc." was given Metcalf by the Public Utilities Engineers, $10,228.40, "replacement cost" excluding (15%) contractor's profit, or $15,342.60 inclusive.

The item "Steel and Wood Pipe" was derived from Items No. 1 and No. 2 in foot-note to Def. Exh. 54-19, sheet 11, which show the replacement value of the wood stave pipe to be $2,883.70 and of the steel pipe $10,057.47, making a total of $12,941.17. Inasmuch as these values are the total replacement value, including 10% engineering, 15% contractor's profit, and 8.4% over-all interest allowance, the replacement cost plus 15% profit only would be in the ratio of 115% to 135.5% x $12,941 = $8,480.

This item indicates by comparison with the items of all of the other witnesses that either the excavation and backfilling and laying expenses were omitted or that they were included in the items relating thereto and not in the item "Steel and Wood Pipe."

1316 PL. EXH. B3.

Metcalf (Continued).

Jan. 7th, 1915.—L. M.

Analysis Distri. Pipe System of the Public Utilities Engineers.

Metcalf in Rebuttal.

The sum total of these items is—

	Amount, inc. 15% contractor's profit.	Per foot of pipe.
C. I. Pipe	$2,185,943	97.0¢
Specials	104,641	4.6
Valves, boxes, Smith Specials, Pits	256,149	11.4
Hydrants (set in place)	168,523	7.5
Excavation and Backfilling	383,160	17.0
Laying, Labor, Lead and Yarn	306,347	13.6
Sheeting and Bracing	21,773	1.0
Pavements	491,700	21.8
River and Bridge Crossings	14,300	0.6
Obstructions, R. R., El. Tel	15,343	0.7
Steel and Wood Pipe	8,480	0.4
	$3,956,359	$1.756

This amount, $3,956,359, is comparable with the total amount shown in Def. Exh. 54-19, sheet 11, with the following modifications:

Def. Exh. 54-19, sheet 11, Van Diest, replacement cost.		$3,404,726.26
do. do. 15% contractor's profit.		510,708.95
		$3,915,435.21
Less correction for credit (Van Diest) on wood stave pipe	$7,549.39	
" steel "	408.59	7,957.98
		$3,907,477.23
Add account 30" C. I. Pipe Capitol Hill, 5,570 ft. Van Diest's Def. Exh. 54-19, sheet 9, replacement cost	$41,420.97	
Contractor's profit, 12½%	5,177.62	46,598.59
		$3,954,075.82
Metcalf's footing		3,956,359
		$2,283

This error, $2,283, is about 1/20 of 1%, and if the figures on trenching and backfilling had been applied to the Def. Exh. 28, Schedule of Lengths, instead of to the Pl. Exh. C, Schedule, the error would have been reduced to about $200 instead of $2,283.

(Endorsed:) 6274. U. S. District Court, district of Colorado. Plaintiff's Exhibit A-100. Filed Oct. 6, 1915. Charles W. Bishop, Clerk.

1317 PLAINTIFF'S EXHIBIT —, TABLES A TO G.

Leonard Metcalf in Rebuttal.

The Denver Union Water Company—Rating Case as of May 1, 1914.

General Comparison of Estimates on Pipe Excavation and Backfilling.

Case No. —.

Complainant's Exhibit No. 8-101. M.

1318 Jan. 12, 1915. L. M.

PLAINTIFF'S EXHIBIT —, TABLES A TO G.

Leonard Metcalf in Rebuttal.

The Denver Union Water Company—Rating Case as of May 1, 1914.

General Comparison of Estimates on Pipe Excavation and Backfilling.

Table A. General Comparison.
Table B. Analysis of Public Utilities Engineer's Estimates.
Table C. Analysis of John Gaffy's Estimates.
Table D. do.
Table E. Analysis of D. G. Gordon's Estimates.
Table F. Analysis of Freemont Hill's Estimates.
Table G. Analysis of Ackert Bickel's Estimates.

(Here follows tabular statement, marked page 1319.)

Plaintiff's Exhibit _____ Table A Leonard Metcalf.
THE DENVER UNION WATER COMPANY - RATING CASE as of May 1, 1914.

com. 6th, 1915. - L.M.

Excavation and Backfilling
Comparison of Witnesses' Estimates.

Comparison of Testimony Submitted by different Witnesses upon the Unit Contract Cost of Excavation and Backfilling, including Contractor's Overhead, Bond, Insurance, Interest Costs and Profit, excluding overhead costs of Water Company.

Plaintiff's Exh.C. Cast Iron Pipe Diam.	Plaintiff's Exh.C. Class B Item 12 p.368 Lin. ft.	Metcalf & Anderson's Plaintiff's Exh.A-15 Cost per lin. ft. Cents	Metcalf & Anderson's Plaintiff's Exh.A-15 Amount in Dollars	Public Utilities Engineers by Van Diest Def.Exh.28 inc. 18% contractor's overhead and profit Cost per foot	Public Utilities Engineers by Van Diest Def.Exh.28 inc. 18% contractor's overhead and profit Amount	Caffy Def.Exh.57 & 58 inc.15.92% overhead and profit Cost per foot	Caffy Def.Exh.57 & 58 inc.15.92% overhead and profit Amount	Gordon Def.Exh.60 p.2 plus 10.28% contractor's overhead and profit Cost per foot	Gordon Def.Exh.60 p.2 plus 10.28% contractor's overhead and profit Amount	Hill Def.Exh.63 inc.10% contractor's overhead and profit Cost per foot	Hill Def.Exh.63 inc.10% contractor's overhead and profit Amount	Nickel Def.Exh.65 inc.16% contractor's overhead and profit Cost per foot	Nickel Def.Exh.65 inc.16% contractor's overhead and profit Amount	Nickel's Def.Exh.65 and in Testimony 21.17% Contractor's entire overhead & profit. Cost per foot	Nickel's Def.Exh.65 and in Testimony 21.17% Contractor's entire overhead & profit. Amount
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(13)	(14)
3"	11,109	20.	2,220	26.4¢	$ 2,930.	11.38	1,260	9.93	887	6.27	700	11.52	1,280	12.03	1,340.
4"	237,098	24.	56,908	33.16	31,240.	11.86	27,430	8.87	19,808	6.27	14,880	11.52	27,320	13.03	28,520.
6"	1,202,521	25.	300,630	16.24	195,290.	12.00	144,280	8.82	106,060	6.27	75,450	11.52	138,600	13.03	144,660
8"	183,634	26.	47,745	17.14	31,470.	12.84	23,760	9.32	17,112	6.27	11,500	13.94	25,620	14.56	26,740
10"	84,387	27.	22,784	18.79	15,850.	14.65	12,360	11.02	9,289	6.27	5,300	16.26	13,720	16.98	14,310
12"	331,999	29.	96,280	17.72	58,830.	16.61	55,130	12.13	40,259	6.27	20,830	17.42	57,840	18.20	60,410
14"	39,972	34.	12,290	14.81	5,920.	18.46	6,270	14.33	4,868	6.27	2,130	23.06	7,490	23.04	7,830
16"	6,177	39.	2,409	23.10	1,430.	19.51	1,210	15.43	941	6.27	390	22.19	1,370	23.16	1,430
18"	65,604	43.	28,210	22.48	14,740.	20.56	13,490	16.54	10,850	6.84	4,490	22.19	14,550	23.16	15,180
18"	18,910	49.	9,266	19.07	3,720.	23.73	4,300	18.74	3,541	6.84	1,290	27.37	5,290	29.20	5,530
20"	13,340	50.	6,670	19.92	2,660.	24.88	3,320	20.95	2,785	10.27	1,370	29.13	3,890	30.43	4,060
24"	61,682	60.	37,009	28.24	17,410.	29.55	18,230	24.25	14,938	10.27	6,340	31.77	19,590	33.18	20,450.
30"	5,970	74.	4,238	46.0	2,560.	37.13	2,070	30.87	1,698	13.70	760	44.90	2,490	45.96	2,550.
Total	2,255,997	27.77¢	$626,589	16.95¢	$ 388,160.	13.87	$312,100	10.33¢	$232,806	6.44	$145,480	14.14	$319,000	14.77¢	333,020.

Computations by Slide Rule--probably correct to nearest ten dollars in "Amounts".

1320 Jan. 10, 1915. L. M.

Analysis of Excavation & Backfilling on Basis Public Utilities Engineers. Van Diest. Def. Exh. 28.

Metcalf in Rebuttal.

PLAINTIFF'S EXHIBIT —, TABLE B. LEONARD METCALF.

The Dener Union Water Company—Rating Case as of May 1, 1914.

In Defendants' Exhibit 28, Mr. Edmond C. Van Diest submitted for the Public Utilities Engineers an estimate of the "Cost of Trenching and Backfilling" for pipe of different diameters, including work upon trenches with and without sheeting. These figures excluded the contractor's profit.

In order, therefore, to make general comparison of the Public Utilities Engineers' cost of trenching and backfilling on basis of "The fair Contract Cost" segregation had first to be made of the item of sheeting shown in column (4) below, to obtain the cost exclusive of the sheeting shown in column (5) below, and to this the contractor's profit item of 15% had to be added, column (6) below. The unit costs thus obtained were applied to Metcalf and Anderson, Exhibit C, "lengths in feet" column (2) below, instead of lengths in feet given in Def. Exh. 28. To obtain the comparable amount shown in column (7) below, the item of 30″ pipe was obtained by Metcalf, courtesy of Mr. Fellows, from the Board figures.

DEFENDANTS' EXHIBIT 28. VAN DIEST.

***Metcalf's Analysis** of Fair Contract Cost of Trenching and Backfilling, as Estimated by Public Utilities Engineers.*

Diam. of pipe.	Length in feet, M. & A.	Cost per lin. ft., excluding contractor's profit. Including sheeting.**	Sheeting.	Excluding sheeting.	Revised cost per ft. exclg. sheeting. Incldg. 15% contractor's profit.	Amount.
Col. (1)	(2)	(3)	(4)	(5)	(6)	(7)
3″	11,103	28.65¢	5.68¢	22.97¢	26.4 ¢	$2,930.
4″	237,098	11.67	0.22	11.45	13.16	31,240.
6″	1,202,521	14.81	0.68	14.13	16.24	195,290.
8″	183,634	15.01	0.10	14.91	17.14	31.470.
10″	84,387	18.12	1.78	16.34	18.79	15,850.
12″	331,999	16.72	1.31	15.41	17.72	58,830.
14″	33,972	12.88	0	12.88	14.81	5,030.
15″	6,177	20.11	0.02	20.09	23.10	1,430.
16″	65,604	19.55	0	19.55	22.48	14,740.
18″	18,910	18.91	1.80	17.11	19.67	3,720.
20″	13,340	17.32	0	17.32	19.92	2,660.
24″	61,682	26.14	1.59	24.55	28.22	17,410.
30″	5,570	40.	0	40.	46.0	2,560.
	2,255,997				16.99¢	$383.160. †

† Exh. 28. Trenching & Backfilling, incl'd'g sheeting		$348,089.40 2,228.00	
		$350,317.40	
15%		52,547.61	
		$402,865.01	
Deduct Sheeting	$18,932.77		
15% on "	2,839.92	$21,772.69	$381,092.32
Error			$2,068.= ½ of 1%.

This error is due to the difference in lineal feet of pipe of different sizes under this (Metcalf & Anderson's Exh. C) Schedule and that of Def. Exh. 28.

Computation by 10" Slide Rule.

** Irregularity due to varying amounts of overcasting or rehandling of earth upon different lines.

1321 Jan. 6th, 1915.—L. M.

Analysis Excavation and Backfilling on Basis John Gaffy's Def. Exh. 57 and 58.

PLAINTIFF'S EXHIBIT —, TABLE C, LEONARD METCALF.

The Denver Union Water Company—Rating Case as of May 1, 1914.

In Gaffy's Defendant's Exhibit 57, page 134, Items 12 *a* and *c* Mr. Gaffy gives the following amounts:

Excavation, machine work....	527,907	c. y.	21.4 ¢	$112,972
" hand work.....	508,896	c. y.	28.8 ¢	146,562
Total excavation.....	1,036,803	c. y.	25.03¢	$259,534
Backfilling	1,036,803	c. y.	10 ¢	103,680
Total	1,036,803	c. y.	35.03¢	$363,214

This average rate per cubic yard, (35.03¢) was therefore applied by Metcalf to the quantities in cubic yards per linear foot of trench for pipes of different diameters given in Gaffy's Defendant's Exhibit 58, page 116, thus arriving at the unit costs per foot of pipe of pipes of different diameter on the basis assumed by Mr. Gaffy, including, as stated by him, 12% contractor's overhead costs and profit. To the figures thus arrived at and shown in Column 3 hereunder was then added Gaffy's allowance of 3.52% approximately, (applied to the combined contractor's cost and overhead and profit,) to cover the contractor's bond, insurance and interest, thus giving a grand total contractor's overhead, bond, insurance and interest cost and profit of 15.92% upon the estimated contractor's cost, excluding the said items. In other words, the results obtained in Column 3 are multiplied by the factor 1.0352 in order to obtain the items shown in Column 4.

1322 Jan. 6th, 1915.—L. M.

Analysis Excavation and Backfilling on Basis John Gaffy's Def. Exh. 57 and 58.

PLAINTIFF'S EXHIBIT —, TABLE D, LEONARD METCALF.

The Denver Union Water Company—Rating Case as of May 1, 1914.

Metcalf's analysis of John Gaffy's estimated cost per foot of excavation and backfilling upon the distribution pipe system, including 15.92% contractor's overhead, bond, insurance, and interest costs and profit.

Diameter pipe in inches.	Linear ft.	Cost per lin. ft., inc. 12% overhead and profit.	Cost per lin. ft., inc. 15.92% contractor's overhead, bond, ins., and int. costs and profit.	Amount.
(1)	(2)	(3)	(4)	(5)
3	11,103	10.99¢	11.377¢	$1,260
4	237,098	11.17	11.563	27,420
6	1,202,521	11.59	11.998	144,280
8	183,634	12.50	12.940	23,760
10	84,387	14.15	14.648	12,360
12	331,999	16.04	16.605	55,130
14	33,972	17.83	18.458	6,270
15	6,177	18.85	19.514	1,210
16	65,604	19.86	20.559	13,490
18	18,910	21.96	22.733	4,300
20	13,340	24.03	24.876	3,320
24	61,682	28.55	29.555	18,230
30	5,570	35.87	37.133	2,070
Total ..	2,255,997	13.40¢	13.878¢	$313,100

1323 Jan. 6th, 1915.—L. M.

Analysis Excavation and Backfilling on Basis Gordon's Def. Exh. 60.

PLAINTIFF'S EXHIBIT —, TABLE E, LEONARD METCALF.

The Denver Union Water Company—Rating Case as of May 1, 1914.

In Gordon's Defendant's Exhibit 60, page 2, are given the estimated costs per foot for pipes of different diameters of "trenching and backfilling" excluding allowance for contractor's overhead costs and profit.

In order, therefore, to make Gordon's figures upon excavation and backfilling comparable with those of the other witnesses on the basis

of "fair contract cost" Metcalf added to Gordon's figures 10.25% to cover Gordon's allowance for "tools, interest, liability and bond, unlooked for conditions and contingencies, profit and office expense," Mr. Gordon's actual figures amounting to 10.27%. The error thus introduced (for convenience in computation) is negligible for comparative purposes, amounting to less than 1/5 of 1%.

1324 Jan. 6th, 1915.—L. M.

Analysis Excavation and Backfilling on Basis Freemont Hill's Def. Exh. 63.

PLAINTIFF'S EXHIBIT —, TABLE F. LEONARD METCALF.

The Denver Union Water Company—Rating Case as of May 1, 1914.

In Defendant's Exhibit 63, Mr. Freemont Hill submitted his estimate of the necessary width of trench and a condensed computation of the cubic yards of excavation involved per linear foot of trench for pipes of different diameter, assumed to be "6 feet deep" arriving at a total footing of 950,845 cubic yards of excavation and backfilling. To this amount he applied a rate of 14¢ per cubic yard, excluding contractor's profit, giving a total sum of $133,116.30, or, adding his 10% contractor's profit, $146,427.93.

Detailed computation was therefore made by Metcalf of the excavation and backfilling per linear foot of pipe of each diameter upon Hill's assumed basis, and price of 15.4¢ per cubic yard, including 10% contractor's profit and overhead, was applied thereto, thus giving the cost per foot of pipe and amount for pipes of each diameter, as shown below.

Dec. 17, 1914.

Dia. of pipe.	Assumed width of trench.	Assumed depth of trench.	Linear feet.	Excavation per linear foot.	
				Cu. yds.	Cost. ¢
1	2	3	4	5	6
30″	4′	7′– 2″	5,570	1.06	20
24″	3′	6′– 8″	61,682	0.74	14
20″	3′	6′– 4″	13,340	0.704	13
18″	3′	6′– 2″	18,910	0.685	13
16″	28″	6′	65,604	0.518	10
15″	28″	5′–11″	6,177	0.51	10
14″	28″	5′–10″	33,972	0.507	10
12″	24″	5′– 8″	331,999	0.42	8
10	24″	5′– 6″	84,387	0.393	7
8″	20″	5′– 4″	183,634	0.296	6
6″	20″	5′– 2″	1,202,521	0.286	5
4″	20″	5′– 0″	237,098	0.278	5
3″	20″	4′–11	11,103	0.273	5
			2,255,997		

* 1 Bell-hole assumed every 12 ft.—10%=10.8 ft. † At 15% per cu. yd.

NOTE.—Computations made by slide rule.
Note that in addition to 16% overhead and profit, Bickel adds on

(Endorsed:) 6274. U. S. District Court, district of Colorado. P

PLAINTIFF'S EXHIBIT TABLE G.

Denver Union Water Company.

Rating Case.

Cast Iron Pipe Laying—Defendant's Exhibit 65, Ackert Bickel.

Excavation, Backfilling, and Pipe Laying Costs on Basis of Ackert Bickel's Figures.

Metcalf & Eddy, Consulting Engineers, Boston, Chicago.

Excav. + Bell hole + backfilling per lin. ft. (6 + 7 + 8 = 9).	Laying & Caulking per lin. ft. of pipe.	Lead and jute per lin. ft. pipe.	Hauling & storage of lead & jute.	Total cost of laying, cols. (10 +11+12= 13).	Excl. contractor's overhead & profit, grand total cost excav. laying, lead and yarn, & backfill. (Cols. 9 + 13.)		Incl. 16% Overhead & Profit.				Inc. 16% overhead & profit, plus 4.46% contractor's contingencies, giving 21.17% total.			
							Excav. Bell hole & backfill, per lin. ft. = col. 9.		Laying lead & yarn, 13.		Excav. Bell hole & backfill, 16 x 1.0446. column		Laying, lead and yarn, column 18 x 1.0446.	
					Per ft. pipe.	Amount.	per ft.	Amount.	Per ft.	Amount.	Per ft.	Amount.	Per ft.	Amount.
¢	¢	¢‡	¢	$	¢	$	¢	$	¢	$	¢	$	¢	$
9	10	11	12	13	14	15	16	17	18	19	(20)	(21)	(22)	(23)
37.85	30	18.5	0.25	48.75	86.6	4,824	43.90	2,440	56.55	3,150	45.86¢	$2,550	59.07¢	$3,290
27.39	20	14.9	2.11	37.01	64.4	39,725	31.77	19,590	42.93	26,490	33.18	20,450	44.84	27,630
25.11	14	12.25	0.14	26.39	51.5	6,877	29.13	3,890	30.61	4,080	30.43	4,060	31.98	4,260
24.11	11	10.7	0.19	21.89	46.0	8,689	27.97	5,290	25.39	4,800	29.22	5,530	26.55	5,020
19.11	10	9.85	0.14	19.99	39.1	25,683	22.17	14,550	23.19	15,200	23.16	15,180	24.25	15,910
19.11	9	7.67	0.12	16.79	35.9	2,220	22.17	1,370	19.48	1,200	23.16	1,430	20.35	1,260
19.02	9	7.	0.08	16.08	35.1	11,940	22.06	7,490	18.65	6,340	23.04	7,830	19.48	6,620
15.02	6	6.	0.08	12.08	27.1	89,874	17.42	57,840	14.01	46,510	18.20	60,420	14.63	48,570
14.02	4.5	5.	0.08	9.58	23.6	19,879	16.26	13,720	11.11	9,380	16.98	14,310	11.61	9,780
12.02	3.	4.	0.08	7.08	19.1	35,041	13.94	25,620	8.21	15,080	14.56	26,740	8.58	15,770
9.93	2.5	3.	0.07	5.57	15.5	185,876	11.52	138,600	6.46	77,700	12.03	144,660	6.75	81,170
9.93	2.	2.2	—0.13	4.07	14.	33,135	11.52	27,320	4.72	11,200	12.03	28,520	4.93	11,700
9.93	1.5	1.49	0.02	2.97	12.9	1,436	11.52	1,280	3.45	380	12.03	1,340	3.60	400
			At $1 per ton.		20.6	465,198	14.14	319,000§	9.82	221,510§	14.77¢	333,020**	10.25	231,380**
					Add 16%	74,432								
						539,630		$319,000						
								221,510						
								$540,510						

‡3.47¢ per lb. jute at 4.24¢ per lb.

§ approximately 4.46% Contractor's contingencies ($370,000 on [$8,206,565] $8,292,440 revised).

Note the sum of the footings of columns 18 and 19 should am ount to $539,630 (Col. 12 is Col. 14—(Cols. 9+10+11).)

Excavation & Backfill	$333,020
Laying	231,308
Total	$564,400

Should be $563,697 error $910 or 1/6 of 1%.

Exhibit A-101. Filed Oct. 6, 1915. Charles W. Bishop, Clerk.

Metcalf's analysis of Freemont Hill's estimated cost of excavation and backfilling of distribution pipe system, based upon Def. Exh. 63, *including* 10% *contractor's profit and overhead allowance.*

Dia. of pipe.	Length of trench, feet.	Width of trench, inches.	Cu. yds. of excavation assumed 6 ft. deep.		Cost of combined excn. & backfill @ 15.1¢ per cu. yd., inc. 10% profit and overhead.	
			Assumed amount.	Per ft. of pipe.	Per ft. pipe, cets.	Amount, dollars.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
30″	5,570	48	4,951	0.889	13.70	$760
24	61,682	36	41,122	0.667	10.27	6,340
20	13,340	36	8,893	0.667	10.27	1,370
18	18,910	24	8,400	0.444	6.84	1,290
16	65,604	24	29,157	0.444	6.84	4,490
15	6,177	22	2,518	0.4074	6.27	390
14	33,972	22	13,845	0.4074	6.27	2,130
12	331,999	22	135,260	0.4074	6.27	20,830
10	84,387	22	34,380	0.4074	6.27	5,300
8	183,634	22	74,815	0.4074	6.27	11,520
6	1,202,521	22	489,910	0.4074	6.27	75,450
4	237,098	22	96,594	0.4074	6.27	14,886
3	11,103	22	4,525	0.4074	6.27	700
	2,255,997		944,370			$145,450

Computations made with 20″ slide rule, with some exceptions where greater accuracy was desired. Error approximately 2/3 of 1%, the total excavation found being 944,370 cubic yards instead of 950,845 cubic yards, and the total amount being $145,450 instead of $146,428.

(Here follows Tabular Statement marked page 1325.)

1326 PLAINTIFF'S EXHIBIT —, TABLES A TO F.

—— Court.

Leonard Metcalf in Rebuttal.

The Denver Union Water Company—Rating Case as of May 1, 1914.

Comparison of Estimates on Pipe Laying Costs (Labor, Lead, and Yarn).

Case No. —.

Complainant's Exhibit No. A-102 M.

1327 Jan. 13, 1915.—L. M.

PLAINTIFF'S EXHIBIT —, TABLES A TO F.

Leonard Metcalf in Rebuttal.

The Denver Union Water Company—Rating Case as of May 1, 1914.

Comparison of Estimates on Pipe Laying Costs (Labor, Lead, and Yarn).

Table A. Summary.
Table B. Analysis of Public Utilities Engineers' Estimates.
Table C. Analysis of John Gaffy's Estimates.
Table D. Analysis of D. G. Gordon's Estimates.
Table E. Analysis of Freemont Hill's Estimates.
Table F. Analysis of Ackert Bickel's Estimates.

(Here follows Tabular Statement marked page 1328.)

Jan. 6th, 1915. - L. M.

Plaintiff's Exhibit _____ Table A Leonard M

THE DENVER UNION WATER COMPANY - RATING CASE as of M

Comparison of Testimony Submitted by different Witnes es

Fair Contract Cost of Laying Cast Iron Pipe

comprising cost of labor, lead and jute, and contractor's interest costs and profit, excluding cost of excavation, b tions, pavement, etc., and

excluding overhead costs of the Water Company.

Diameter Inches	Length Feet	Metcalf & Anderson, Exhibit C Per.lin. ft. ¢	Amount	Public Utilities Engineers; Van Diest Def.Exh.28 Per. lin. ft. ¢	Amount
Col. (1)	(2)	(3)	(4)	(5)	(6)
3	11,103	5.	555	6.44	715
4	237,098	6.	14,226	7.36	17,450
6	1,202,521	8.	96,202	9.66	116,163
8	183,634	10.	18,363	12.68	23,652
10	84,387	13.	10,970	16.67	14,067
12	331,999	16.	33,120	19.89	66,035
14	33,972	19.	6,455	24.03	8,163
15	6,177	21.	1,297	25.76	1,591
16	65,604	22.	14,433	27.37	17,956
18	18,910	26.	4,917	31.39	5,936
20	13,340	30.	4,002	35.76	4,770
24	61,662	40.	24,673	43.58	26,861
30	5,570	54.	3,008	53.3	2,968
Total	2,255,997		$252,221		$306,347
Average per lin.ft.		11.18¢		13.58¢	
Contractor's Profit Included		15%			15%*

*Except on 30" which was 12½%

Pipe Laying Costs.
Comparison of Witnesses' Estimates.

Metcalf.

May 1, 1914.

e upon the

overhead, bond, insurance,
backfill, sheeting, obstruc-

.

Caffy, Def. Exhibit 58, page 115.		Gordon, Def. Exhibit 59		Freemont Hill, Def. Exhibit 63		Albert Nickol Def. Exh. [illegible] in Testimony	
Per. lin. ft. ¢	Amount	Per. lin. ft. ¢	Amount	Per. lin. ft. ¢	Amount	Per lin [illegible]	Amount
(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
4.14	460	3.64	404	7.56	839	3.00	[illegible]
5.16	12,270	6.00	14,220	9.66	22,904	[illegible]	[illegible]
8.28	99,590	7.50	90,187	11.33	136,246	[illegible]	[illegible]
10.35	19,010	9.06	16,634	19.12	35,111	[illegible]	[illegible]
13.46	11,360	7.95	6,702	20.83	17,578	11.[illegible]	[illegible]
13.93	51,550	14.11	46,831	22.60	75,032	14.[illegible]	[illegible]
17.60	5,980	14.27	4,837	30.13	10,236	19.[illegible]	[illegible]
19.67	1,210	17.27	1,053	33.77	2,086	20.[illegible]	[illegible]
24.85	16,300	19.31	12,677	34.92	22,909	24.[illegible]	[illegible]
27.95	5,290	23.88	4,513	49.21	9,306	30.[illegible]	[illegible]
31.06	4,140	27.95	3,717	51.26	6,838	31.[illegible]	[illegible]
37.27	22,990	33.79	20,814	53.22	32,827	44.[illegible]	[illegible]
48.56	2,710	45.09	2,645	82.12	4,574	59.[illegible]	[illegible]
	$252,860		$225,234		$376,486		$231,[illegible]
10.77 ¢		10.0 ¢		16.7 ¢		10.[illegible]	
	15.92%		10.25% †		10%		31.17%

† Gordon's assumption was 10.27%

1329 Jan. 6, 1915.—L. M.

PLAINTIFF'S EXHIBIT —, TABLE B.

Analysis Pipe Laying Costs on Basis of Van Diest's (Pub. Uti. Engi.) Prices, Def. Exh. 28.

Leonard Metcalf in Rebuttal.

The Denver Union Water Company—Rating Case as of May 1, 1914.

To the pipe laying costs submitted by Mr. Van Diest in Defendant's Exhibit 28, we added Mr. Van Diest's 15% allowance for contractor's profit, to obtain his fair contract cost for pipe laying work.

The estimated cost of laying the 30" pipe was obtained by courtesy of Mr. Fellows from the original records of the Public Utilities Engineers.

1330 PLAINTIFF'S EXHIBIT —, TABLE C.

Jan. 6th, 1915.—L. M.

Analysis Pipe Laying Costs on Basis of John Gaffy's Prices, Def. Exh. **57.**

Leonard Metcalf.

The Denver Union Water Company—Rating Case, as of May 1, 1914.

The pipe laying costs shown in Gaffy's Exh. 57, page 134, Item 12*b*, include 12% contractor's overhead costs and profit, but don't include allowance for contractor's bond, liability insurance, and contractor's interest costs. The latter upon Gaffy's figures amount to 3.52% of the cost, including contractor's overhead and profit, which correction was therefore made, resulting in the following figures:

Metcalf's Analysis of John Gaffy's Cost of Pipe Laying (Covering Labor Cost, Lead, and Yarn), Including 15.92% Contractor's Overhead, Bond, Insurance, Interest, and Profit, Based upon Def. Exh. 57, Page 134.

Diameter, pipe in inches.	Lin. ft. of pipe.	Cost per lin. ft., inc. 12% overhead & profit, see Exh. 57, p. 134.	Corrected cost per lin. ft., inc. col. (3) x 1.0352.	Corrected amount, col. (2) x (4).
(1)	(2)	(3)	(4)	(5)
3.....	11,103	4. ¢	4.141¢	$460
4.....	237,098	5.	5.176	12,270
6.....	1,202,521	8.	9.282	99,590
8.....	183,634	10.	10.352	19,010
10.....	84,387	13.	13.458	11,360
12.....	331,999	15.	15.528	51,550
14.....	33,972	17.	17.598	5,980
15.....	6,177	19.	19.669	1,210
16.....	65,604	24.	24.845	16,300
18.....	18,910	27.	27.950	5,290
20.....	13,340	30.	31.056	4,140
24.....	61,682	36.	37.267	22,990
30.....	5,570	47.	48.564	2,710
Total.	2,255,997	....	10.765¢	$252,860

1331 PLAINTIFF'S EXHIBIT —, TABLE D.

Jan. 6th, 1915.—L. M.

Analysis Pipe Laying Costs on Basis of D. G. Gordon's Def. Exh. 60.

Leonard Metcalf.

The Denver Union Water Company—Rating Case, as of May 1, 1914.

The figures on cost of pipe laying, comprising labor, lead and jute costs, contained in Defendant's Exhibit 60, are exclusive of contractor's overhead and profit allowances. They have therefore been increased by a total amount of 10.25%, which comprises 6.92% contractor's overhead costs and profit plus 3.33%, Gordon's allowance for "tools, interest, liability and bond, unlooked for conditions and contingencies," Gordon's total addition being $101,000 or 3.35%, 3.33% being used here as a matter of convenience in figuring, the error introduced thereby being approximately 1/5 of 1%.

Metcalf's Computation of D. G. Gordon's Estimate of Cost of Pipe Laying (the Latter Comprising Labor, Lead, and Jute), with Contractor's Overhead, Bond, Insurance, Interest, and Contingent Costs, and Profit of 10.25% (Gordon Having Actually Assumed 10.27%).

Diameter, pipe in inches.	Pipe length in feet.	Cost per foot.	Amount.
(1)	(2)	(3)	(4)
3.....	11,103	$.0364	$404
4.....	237,098	.06	14,220
6.....	1,202,521	.075	90,187
8.....	183,634	.0906	16,634
10.....	84,387	.0795	6,702
12.....	331,999	.1411	46,831
14.....	33,972	.1427	4,837
15.....	6,177	.1727	1,053
16.....	65,604	.1931	12,677
18.....	18,910	.2388	4,513
20.....	13,340	.2795	3,717
24.....	61,682	.3379	20,814
30.....	5,570	.4809	2,645
	2,255,997'	10.0¢	$225,234

1332 PLAINTIFF'S EXHIBIT —, TABLE E, METCALF.

The Denver Union Water Company.

Analysis Pipe Laying Costs.

On Basis of Fremont Hill's Figures.

Jan. 5, 1915.

L. M. L. M.

The following detailed figures on pipe laying costs of Fremont Hill as applied to Class S. Distribution Pipe System, including the labor cost of handling and laying pipe and the cost of lead and jute, including 10% contractor's profit and overhead, was determined from Defendant's Exhibit 63 (Fremont Hill) in the following manner:

To the cost of "Laying in cts. per ft." was added Hill's allowance 10% profit and overhead cost. The figures thus obtained for each pipe size from 3 inches to 30 inches were then increased in the ratio of $170,058 to $110,488, equivalent to 154% to cover the cost of laying valves and hydrants which were added by Mr. Hill in lump sums.

The amount of "Pounds of Lead" used in each pipe size was reduced to a "per ft. of pipe basis." To the latter was then applied

Hill's cost of lead—5.225¢ per pound, including 10% overhead and profit. The figures upon cost of lead per lin. ft. of pipe of each diameter thus found were then increased in the ratio of the total tons of lead given by Hill, including the lead used in laying specials, hydrants and valves and amounting to 1,756 tons, to the tonnage found as above stated upon the pipe laying alone, 1,291.17 tons, equivalent to 136%.

The cost of the Jute per lineal ft. of pipe of each diameter was found in a similar manner to that used for the lead. Hill's price including 10% overhead and profit being 5.775¢ per pound. The cost per lin. ft. of jute upon the pipe being increased in the ratio, 104,254 pounds, total including the jute used in laying specials, hydrants and valves, to 82,237 pounds used in laying the pipe only, equivalent to 127%.

The prices thus found are as follows:

Metcalf's Analysis of Fremont Hills Cost of Laying Pipe in Distribution Pipe System. Comprising Therein Only the Labor of Laying and the Cost of the Lead and Jute, with 10% Contractor's Overhead Cost and Profit Based Upon Defendants' Exhibit 63 (Fremont Hill).

Diam. pipe. inches.	Length in feet.	Revised costs per foot, incldg. 10% contractor's.			Total revised cost of labor of laying, lead, & jute, including 10% contractor's overhead and profit.	
		Laying.	Lead.	Jute.	Per foot.	Amount.
30″	5,570	52.5¢	28.4¢	1.22¢	82.12¢	$4,574
34″	5,570	52.5¢	28.4¢	1.22¢	82.12¢	$4,574
24″	61,682	28.6	23.7	.92	53.22	32,827
20″	13,340	28.6	21.9	.76	51.26	6,838
18″	18,910	28.6	20.0	.61	49.21	9,306
16″	65,604	16.6	17.75	.57	34.92	22,900
15″	6,177	16.6	16.6	.57	33.77	2,086
14″	33,972	16.6	13.03	.50	30.13	10,236
12″	331,999	11.0	11.23	.37	22.60	75,032
10″	84,387	11.0	9.5	.33	20.83	17,578
8″	183,634	11.0	7.85	.27	19.12	35,111
6″	1,202,521	5.08	6.06	.19	11.33	136,246
4″	237,098	5.08	4.45	.13	9.66	22,904
3″	11,103	5.08	2.37	.11	7.56	839
Total ...	2,255,997 ft.	....	....	....	16.7¢	376,486

1333 PLAINTIFF'S EXHIBIT —, TABLE F, LEONARD METCALF.

The Denver Union Water Company—Rating Case as of May 1, 1914.

Jan. 6th, 1915.—L. M.

Analysis Pipe Laying Costs on Basis of Ackert Bickel's Def. Exh. 65, and His Testimony.

The following table, showing the detailed costs of laying pipe of different diameters, including Bickel's 16% contractor's overhead costs and profit, was prepared from the testimony submitted by Mr. Bickel, in explanation of his Class S distribution pipe system schedule.

To it has been added Bickel's overall allowance of 4.46% to cover "Contractor's general overhead and contingencies" (Def. Exh. 65, p. 67*a*. revised by Bickel) making the equivalent total Contractor's overhead costs, bond, liability insurance, contingencies and profit, 21.17% on his basic cost.

See Exhibit on Excavation and Backfilling. Table G for these details.

(Endorsed:) 6274. U. S. District Court, District of Colorado. Plaintiff's Exhibit A-102. Filed Oct. 6, 1915. Charles W. Bishop, Clerk.

1334 PLAINTIFF'S EXHIBIT A-103, TABLES A TO H.

L. M.

Leonard Metcalf in Rebuttal.

The Denver Union Water Company—Rating Case of May 1, 1914.

Actual Construction Periods of the More Important Structures of The Denver Union Water Company.

Case No. —.

COMPLAINANT'S EXHIBIT No. A-103. M.

1335 PLAINTIFF'S EXHIBIT —, TABLES A TO H.

Jan. 7, 1915.—L. M.

Leonard Metcalf, The Denver Union Water Company, Rating Case as of May 1, 1914.

Construction Periods.

Actual, of the More Important Structures of The Denver Union Water Co.

Tables A-D. Cheesman Dam.
Table E. Marston Reservoir.

Slow Sand Filters.
Platte Canon Reservoir.
Capitol Hill Reservoir.
Table F. Conduits 1-7.
Table G. Conduits 8, 9.
Distribution System, 1890.

1336 PLAINTIFF'S EXHIBIT —, TABLE A, METCALF.

Jan. 7th, 1915.—L. M.

Construction Period Cheesman Dam.

Metcalf in Rebuttal.

Summarized Statement of Period of Time Involved in Design and Construction of Cheesman Dam.

The Denver Union Water Company—Rating Case as of May 1, 1914.

1892–1898.	6 years' surveys and plans, net period	22	months
	Clearing up "filing" plans with United States Government, net time	19	"
	Clearing up "placer claims" net time	5	"
	Construction period, say net time	8	" ?
	Total net time, 2 years 8 months	32	
1898–1900.	2 years' active construction on rock fill dam, net time, and in tunneling.	19	months
1900–1904.	3 mos.' plans and studies in dam. 4 years' active construction present dam, net time	4 years,	1 month
	Gross period 12 years comprising—		
	Surveys and plans,	2 years,	1 month
	"Filing plans" United States Govt.	1 "	7 months
	Clearing up "placer claims"		5 "
	Construction,	6 "	4 "

Of the latter period, perhaps 1 year and 4 months was lost by the washing out of the loose rock of the rock fill dam. The work done upon the foundations and the steel faced masonry core wall of the latter remained, however, and was incorporated in the present structure.

1337 PLAINTIFF'S EXHIBIT —, TABLE B, METCALF.

The Denver Union Water Company—Rating Case as of May 1, 1914.

Jan. 7th, 1915.—L. M.

Construction Period Cheesman Dam.

Metcalf in Rebuttal.

Statement of Work Done on Cheesman Dam from 1892 *to* 1904, *Both Inclusive.*

1892. Some months of reconnoissance works.
1893. Six months' surveys.
1894. 8 months of planning and construction.
11½ " conferring and correspondence with U. S. Govt. officials in regard to the "filing plans," etc.
1895. 7½ months more conference and corresponding with Govt. officials on "filing plans."
5 months clearing up placer claims.
Some construction work on tunnels.
1896. 1 month's surveys and assessment work.
1897. 1 month, surveys completed.
1898. 3 months, further investigation of different dams built in the United States.
3 months, construction on rock fill dam.
1899. 12 months, construction on rock fill dam.
1900. 4 months, construction on rock fill dam.
May 3rd, rock fill dam partially washed out.
3 months, further studies and plans.
4 months, construction on present dam.
1901. 1 year, do.
1902. 1 " do.
1903. 1 " do.
1904. 9 months, do.

1338 (C.)

Detailed Statement of the Period of Time Required for the Planning and Construction of Cheesman Dam.

1892. February, James D. Schuyler, in reporting upon the Strong Reservoir, recommended that studies be made of other available stream-bed reservoir sites.

From P. 261, Testimony of W. F. Allen in the matter of the Petition of The South Platte Canal and Reservoir Company for the adjudication of water rights of Lake Cheesman for beneficial purposes other than irrigation. Testimony

taken before C. P. Gehman, at Hartsel, Colo., Sept. 1912, for the District Court of Colorado in the District of Park County.

During the year 1892 Schuyler, C. P. Allen and others made reconnoissances through the South Park District, following up the above recommendation.

1893. Late in April or early in May, W. F. Allen began surveys of the Bonus and Mosier reservoir sites. Page 262.

September, 1893, C. P. Allen, J. A. Osner, A. E. Meek, A. M. Grace, C. P. Allen, Jr., Geo. McNoll, John Williams, and W. F. Allen, also Peter O'Brien, discovered the Cheesman site, locating the dam site September 24th, 1893. Pages 262-3.

Rough contour survey made September 25th.

October 7th, 1893, W. F. Allen returned to the field with a party for permanent survey; completed October 16th, 1893, p. 263.

1894. April 14th, W. F. Allen returned to site and began construction of outlet tunnel. In fall of 1894 C. P. Allen made plans for solid masonry dam, and alternative plans for a rock fill dam.

Jan. 19th, 1894, first filing made. p. 267.

In April, 1894, filing was rejected by the Department of the Interior, and additional surveys followed to comply with the Government requirements.

1895. August 19th.—Filing approved by the Department of the Interior, much correspondence between the Company and the Washington authorities having passed in the interval.

August, 1895, to December, 1896.—Effort made to clear up placer claims.

1896. December, W. F. Allen took crew of forty or fifty men and constructed power ditches from Goose Creek, performed assessment work on placer claims, and while the gorge in the canon was frozen solid, made the complete contour survey of the dam site.

1897. January, contour survey completed. Surveys made by suspending rodman over the cliffs by rope.

1898. In the summer, C. P. Allen made trip through the west, investigating rock fill dams, George G. Anderson and James D.

Schuyler assisting as consulting engineers upon the plans prepared by Allen.

Early fall of 1898, work preparatory to the construction of the rock fill dam was begun and continued until the washing out of the rock fill behind the dam *in* May 3rd, 1900.

1900. June, studies begun by Chief Engineer C. L. Harrison, with Alfred Noble and Lyman Cooley as consulting engineers.

August 29th, contract entered into with Geddie & Seerie Stone Co. for the construction of the present masonry dam, and work actively prosecuted thereafter until completion.

1903. October 26th.—Supplementary contract relating to construction of Cheesman Dam made with Geddis & Seerie Stone Co.

1904. October 1st.—"Estimate No. 49, final," made upon the completion of the dam by the Geddis & Seerie Stone Co.

In figuring the total time involved in the construction of the present masonry dam, it is to be remembered that all of the preliminary work done upon the rock fill dam in the way of exposing foundations and building core wall faced with steel was incorporated in the final structure, including the driving of the main tunnel, both of which were built at a much earlier date, the tunnel having been finished in the summer (?) of 1898.

1340

Dec. 16, 1914.—L. M.

Actual Construction Periods.

PLAINTIFF'S EXHIBIT —, TABLE E, LEONARD METCALF.

Actual Time Required for Surveying, Planning, and Building the More Important Structures of the Denver Union Water Company.

Marston Lake Reservoir: 2 Years Surveys and Planning. 5½ Years' construction (piecemeal).

1890. March 27.—Surveys of Reservoir Begun (Book 13, pages 11-15).

1892. Feb. 29.—Surveys for Embankment—(Book 13, pages 17).

Aug. Construction begun on the outlet towers and tunnels. Completed in the — — 1893.

In the winter, new reservoir construction begun. Construction begun upon the embankments of the reservoir; suspended in April, 1894, for a period of nearly a year, while the properties of the two companies, The Citizens Water Company and The American Water Works Company, were being combined.

Remember, that there was an old reservoir on the site, having a capacity of say one billion gallons, more or less. This old reservoir was drained by the tunnel construction of 1892 and in the winter of that year the basin partly filled and water was used from it during the season of 1893.

1895. In the spring, construction work resumed upon the embankments and suspended in the winter of 1896.

1899. Late Fall, construction begun again and continued for about a year, until the fall of 1900.

1902. In the early summer, raised the embankments 5 feet and rip-rapped slopes, completing it about spring of 1903.

1904–5. Plans and Estimates begun Dec. 1904, Revised plans and Construction, March 1905, built concrete spillway, apron, etc., during a period of less than one month.

1911. April. Constructed new inlet works to connect with Conduit No. 7 from Platte Canon, completing the work in less than 2 months.

Slow Sand Filter Plant:

Built one basin at a time.

Fall of 1900. Construction was begun and completed in a period of six years the active construction work probably having covered a period of two years or slightly less.

Platte Canon Reservoir:

Required one full year for preparation of plans and construction.

Capitol Hill Reservoir:

Basin No. 1 was built in the year 1887, and lined in a period of six weeks in the year 1893.

Basin No. 2 was built in the years 1906-7, in a period of approximately nine months, exclusive of preparation of plans.

1341 *Actual Construction Periods*—(Cont'd).

(F.)

Dec. 16, 1914.—L. M.

Ashland Reservoir.

Required a period of construction of approximately two and a half years.

Conduits.

Conduit No. 1. 2 years Planning & Construction.

1889. Surveys Begun in November, Work completed in the fall of 1890. Construction begun February, 1890, and completed in the fall of the same year. Diameter 30", length in miles, 21 mi. from Infiltration Galleries to Ashland Ave. Reservoir.

Conduit No. 2. 2 years Planning & Construction.

1892. Surveys and plans begun in spring of 1892. Construction began summer, 1892, completed spring 1894. Diameter 30" & 34", length in miles, 22 mi. from Platte Canon to Capitol Hill Reservoir.

Conduit No. 3. 2½ years Planning & Construction.

1899. Construction began May 19th, 1899, completed fall 1911. Diameter 40"-36" 34" & 30", length in miles, 21 mi. from Filter beds to Ashland Avenue Reservoir.

Conduit No. 4. 1 year Planning & Construction.

On original Construction data missing. Work done 1882-83.

1906. Rebuilt in spring. Survey March 7, Pipe Line soon after. Diameter 48" and 40", length in miles, 2.75 miles, from Mississippi St. Infiltration Gallery to West Side Reservoir. Finished in April, 1907.

Conduit No. 5. About 6 months Planning & Construction.

Cherry Creek, original conduit 36" *inched* in diameter, length 5.44 miles.

1907–8. Rebuilt, 30" & 36".

Conduit No. 6. 2 years Planning & 8 months Construction.

1907. Surveys begun March 5th, Preliminary covering 2 years time on different locations.

Construction begun November, 1909, and completed June, 1910. Diameter 48″ and 40″, length in miles 12.25 miles, from Wynetka to Capitol Hill Reservoir.

Conduit No. 7. Surveys 3 months, Construction 3 months.

1910. Surveys begun Dec. 1st, 1910, construction begun February 9th, 1911, completed May 13th. Note.—That preliminary surveys for this line were made a year or two before. Diameter 48″, length in miles, 10.02 miles, from Platte Canon to Marston Lake.

1342 *Actual Construction Periods*—(Cont'd).

(G.)

Dec. 16th, 1914.—L. M.

Conduit No. 8. Construction 1 yr.

1911. Construction begun November 12, 1911. Line completed November 12th, 1912. Diameter 60″ & 36″, length in miles, 60″—2.58 miles, 36″—.77 miles, from Intake to Platte Canon Spur and Platte Canon Reservoir.

Conduit No. 9.

1912. Surveys begun December.

1914. Construction begun December 1st, Now under construction. 48 inch diameter 6 miles long, from Marston Lake to Alameda Avenue and Federal Boulevard.

Distribution Pipe System.

No significant records of the rate of construction of the Distribution Pipe System are available on account of the piecemeal character of this construction, excepting the work done in the Year 1890 when the American Water Works Company built its plant and attempted to get the business of the Citizens Water Company. The construction work done at that time was pushed with the utmost vigor and the competition was of the keenest sort, resulting finally in the consolidation of the companies as the Denver Union Water Company.

During the period from January 2, 1890, to November 10th, 1890, or substantially one year's construction period, the American Water Works Company laid approximately 98 miles of pipe as appears from the subjoined schedule.

Amount of Pipe Laid by The A. W. W. Co.

Per Report of Pipe Foreman.

From January 2nd, 1890, to November 10th, 1890.

Sept. 13, 1893.—W. F. H.

Diam.	Montclair.	County.	Denver.	Sullivan.	Total.
2″	.....	3.2886 miles	.....	.....	3.2886 miles
3″	.....	.....	.....	.....	
4″	.....	.....	.....	0.6011 miles	0.6011 "
6″	3.7685 miles	2.0059 "	33.3293 miles	0.6134 "	39.7171 "
8″	3.6269 "	0.0509 "	11.9816 "	.....	15.6594 "
10″	1.3219 "	0.0566 "	5.6680 "	.....	7.0465 "
12″	2.8540 "	1.5774 "	7.7822 "	0.0903 "	12.3039 "
14″	0.6174 "	1.5134 "	1.5138 "	.....	3.6446 "
16″	0.0181 "	0.0803 "	7.2252 "	.....	7.3236 "
18″	.....	.....	2.9233 "	.....	2.9233 "
20″	.....	.....	.....	.....	.....
24″	.....	.....	4.0445 "	.....	4.0445 "
30″	.....	.....	0.3333 "	.....	0.3333 "
36″	.....	.....	0.0099 "	.....	0.0099 "
48″	.....	.....	.....	0.2386	0.2386 "
Hydt.	0.3167 "	0.0136 "	0.9892 "	.....	1.3195 "
Total.	12.5235 miles	8.5867 miles	75.8003 miles	1.5434 miles	98.4539 miles

In addition to above there was laid in Denver 0.2932 miles of 4″ pipe Divided as follows:

567 Ft. to take up dead ends.

310 Ft. in Denver Ath. Park.

671 Ft. Relaid on account of Sewer.

(Endorsed:) 6274. U. S. District Court. district of Colorado. Plaintiff's Exhibit A-103. **Filed Oct. 6, 1915.**
Charles W. Bishop, Clerk.

1343 PLAINTIFF'S EXHIBIT A-104, TABLES A TO E.

Leonard Metcalf in Rebuttal.

The Denver Union Water Company—Rating Case as of May 1, 1914.

Case No. —.

Complainant's Exhibit No. A-104.

Computation of Development Expense and Estimated Equitable Gross Annual Revenue Based Upon Arbitrary Assumptions as to Investment Cost and Methods of Accounting Suggested in Testimony by Messrs. Van Diest and Fellows.

1344 PLAINTIFF'S EXHIBIT —, TABLES A TO E.

Leonard Metcalf in Rebuttal.

The Denver Union Water Company—Rating Case as of May 1, 1914.

Jan. 12, 1915.—L. M.

Computation of Development Expense and Estimated Equitable Gross Annual Revenue Based Upon Arbitrary Assumptions as to Investment Cost and Methods of Accounting Suggested in Testimony by Messrs. Van Diest and Fellows.

Table A. Summary of Results.

Table B. Based upon 7% fair return on capital sum, consisting of bonds issued and outstanding, less depreciation allowance figured on straight line method at 1.8% rate, plus deficits or minus excess earnings.

Table C. Based upon 7% fair return on capital sum, consisting of bonds issued and outstanding, less depreciation allowance figured on equal—annual—payment method, with annual depreciation rate of 0.96%.

Table D. Based upon 7% fair return on capital sum, consisting of bonds outstanding in 1895, increased by construction account reported by the Company annually thereafter, less depreciation figured on the straight line method at an annual depreciation rate of 1.44%.

Table E. Based upon 7% fair return on capital sum, consisting of bonds outstanding in 1895, increased by construction account reported by the Company annually thereafter, less depreciation allowance figured on equal—annual—payment method, with annual depreciation rate of 0.8%

1345 PLAINTIFF'S EXHIBIT —, TABLE A.

Nov. 5, 1914.—L. M.

Metcalf in Rebuttal.

L. M.

The Denver Union Water Company.

Metcalf's Supplementary Summary.

Development Expense and Estimated Equitable Gross Annual Revenue for the Year 1914. Based Upon Arbitrary Assumptions as to Investment Cost Since 1894 and Different Methods of Accounting Depreciation Suggested in Testimony by Mr. Edmond C. Van Diest and A. Lincoln Fellows of the Public Utilities Engineers:

NOTE.—The detailed computations appear in the appended Tables B, C, D, E.

1. Based upon fair annual return of 7% upon "capital sum," consisting of bonds issued and outstanding, less depreciation allowance, plus deficit or minus excess in assumed fair return of 7%, with different methods of accounting depreciation, but providing for an assumed total depreciation allowance as of Oct. 31, 1913, amounting in abandoned property to $1,261,000, on existing property to $1,534,000 or a total of $2,795,000.

Table B. With 1.8% "Straight-Line-Depreciation" Annuity,

Development Expense	$711,000	
Equitable Gross Annual Revenue (1914)		$1,295,000

Table C. With 0.96% "Equal-Annual-Payment"-Method-Depreciation Annuity,

Development Expense	$711,000	
Equitable Gross Revenue (1914).		$1,417,000

2. Based upon fair annual return of 7% upon "capital sum," consisting of bonds outstanding in 1895, increased by the construction account reported annually thereafter by the company, less depreciation allowance, plus deficit or minus excess in assumed fair return of 7%, with different methods of accounting depreciation, but providing for an assumed total depreciation allowance as of Oct. 31, 1913, amounting in abandoned property to $1,261,000, on existing property to $1,534,000, or a total of $2,795,000.

CHARTS

TOO

LARGE

FOR

FILMING

Table E. With 0.8% "Equal-Annual-Payment"-Method-Depreciation Annuity,

Development Expense	$3,673,000	
Equitable Gross Annual Revenue (1914)		$1,732,000

Table E. With 0.8% "Equal-Annual-Payment"- Method-Depreciation Annuity,

Development Expense	$3,679,000	
Equitable Gross Annual Revenue (1914)		$1,834,000

(Here follow tabular statements marked pages 1346, 1347, 1348 and 1349.)

1350 PLAINTIFF'S EXHIBIT —, TABLE —.

Leonard Metcalf, in Rebuttal.

The Denver Union Water Company, Rating Case as of May 1, 1914.

Case No. —.

Complainant's Exhibit No. A-105. M.

Estimated Increase in Operating Costs Involved by New Construction Now under Way.

Plaintiff's Exh. —, Table —, Metcalf.

Jan. 12, 1915.

Increased Operating and Maintenance Costs, etc., Involved by New Construction Now under Way.

Metcalf, in Rebuttal.

The Denver Union Water Company—Rating Case as of May 1, 1914.

Estimated Construction Cost of.

1914 to 1915. New 48″ conduit from Marston Lake to city limits, 6½ miles, with appurtenant connections and appliances	$250,000
Between 1915 and 1920—Mechanical filter plant at Marston Lake, 30 to 35 mgd. capacity, not less than	250,000
	$500,000

Increased Operaing Expenses Incident to New Pipe Line, Screenhouse and Hypochlorite Plant.

Foreman and two men for meter reading, pumping plant, care of revolving screens, hypochlorite plant, etc.	$3,000	
Power and light	300	
Chemicals, assumed 4# per mgd. x 12 mgd. or 50# per day@ 4¢ overall	750	
Repairs to conduit, etc	650	
(Note.—3-year average repair account upon conduits, $135 per mile year)		$4,700

Depreciation, say 1%	2,500
Fair return, 7% on $250,000	17,500
Total, (say)	$25,000

Later, when filter plant is built,

Operating Expenses in excess of present operating expenses, filtering 30-35 mgd., say	$15,000	
Depreciation, 1%	2,500	
Return, 7% on $250,000	17,500	
		35,000
Total Increase in Annual Operating Costs and Fixed Charges after Construction of Filter Plant		$60,000

(Endorsed:) 6274. U. S. District Court, district of Colorado. Plaintiff's Exhibit A-105. Filed Oct. 6, 1915. Charles W. Bishop, Clerk.

1351 COMPL'T'S EX. A-106.

Extract Upon Loss in Revenue to City if It Build Its Own Plant Instead of Acquiring the Property of The Denver Union Water Compnay.

From the Report of the Public Utilities Engineers.

Jan. 16, 1914.

(Section- 1-9, pp. 91 & 82.)

If the City builds its own plant, it will lose the profits that would accrue to it by a purchase of the Water Company's plant. These profits would without a change in the rates accrue to the Water Company during the time required to build the Municipal Plant. In order that you may be advised as to the possible profits under the present schedule, during the period of five years, estimated as required to build a new plant, and based on the results of operation for 1912, we find, as follows:

Gross Revenue		$1,383,977.75
Operation & Maint.	$321,087,03	
Taxes and Rentals	126,319.46	
Interest	534,205.81	
Depreciation 1%	112,000.00	
		1,093,612.30
		$290,365.45

If, instead of an allowance for interest only, we allow 6% as a fair return, on an assumed value equal to the outstanding bonds, the total deductions would be $112,000.00 more or a total of $1,205,-612.30 leaving as net income, $178,265.45.

If five years are needed to build the new plant and reconnect the services, the aggregate for that time would be $891,827.25.

1352 The aggregate receipts from schedule rates for the year 1912 amounted to $1,142,654.68. If those rates should be reduced by 10%, the revenue reduction would amount to $114,265.47, reducing the net income to $64,100.00. It must not be forgotten that the year 1912 was the best year the Company has ever had; it was a year of maximum revenues, both gross and net, and is not submitted as a fair criterion of future earnings.

If we take the earnings of the five years, ending November 1st, 1912, we find the average net income under the same conditions to be $109,121.52. If the five years to November 1st, 1913, are taken, and the estimated revenues from 1913 are included in a five-year period, this average net income would be $140,564.42.

We submit the foregoing estimate of the amount of deficiency to November 1st, 1913, as a method of determining the fair amount of Development Expense due to The Denver Union Water Company at that time, in accordance with the opinions of the Courts of last resort. As we have already stated, we are of the opinion that the case under consideration is different from that of other cases in which such values were allowed by the courts, but as practically the entire trend of Court decisions in purchase cases has been toward such an allowance, we think it but fair to suggest the method outlined above, not as an obligation but rather as suggesting a sum which the City might be willing to pay on account of the connections and other advantages incident to taking over an operating plant in preference to taking the time and going to the inconvenience of building a new system.

Sec-. 1-9.

(Endorsed:) 6274. U. S. District Court, district of Colorado. Plaintiff's Exhibit A-106. Filed Oct. 6, 1915. Charles W. Bishop, Clerk.

(Here follow tabular statements marked pages 1353 and 1354.)

1900.

MONTH.	ACTUAL STORAGE	ACRE FEET. ANDERSON	COMSTOCK.	NOTES.
Jan.		1612	1618	
Feb.		1512	1512	
March		4960	4966	
April		15240	15248	
May		61194		
June		72240		
July		1426		
Aug.		-----		
Sept.		-----		
Oct.		5208		
Nov.		4140	4082	
Dec.		2046	2056	
		169578		

1901.

MONTH.	ACTUAL STORAGE.	ACRE FEET. ANDERSON.	COMSTOCK.	NOTES.
Jan.		868	900	
Feb.		840	842	
March		4154	4166	
April		11880	11894	
May		13826		
June		7820		
July		166		
Aug.		9300		
Sept.		4500		
Oct.		1612		
Nov.		6240	6230	
Dec.		5456	5428	
		66182		

1902.

MONTH.	ACRE FEET. ACTUAL STORAGE.	ANDERSON.	COMSTOCK.	NOTES.
Jan.		3844	3825	
Feb.		984	1090	
March		2542	2520	
April		780	5896	
May		----	498	
June		----	----	
July		----	-----	
Aug.		----	----	
Sept.		----	----	
Oct.		744	2	
Nov.		1200	1178	
Dec.		868	866	
		10962	15876	

MONTH.	ACRE FEET. ACTUAL STROAGE.	ANDERSON.	COMSTOCK.	1903. NOTES.	ACRE FEET. FIELD	BULL.	YEAR 4. ACRE FEET. FELLOWS.
Jan.	----	558	520		----	550	-----
Feb.	----	224	216		----	220	-----
March	2331	2790	2802		2331	2800	1883
April	5229	5400	6258		5229	5200	6188
May	797	806	354		----	----	-----
June	1962	1800	18492	(High Line had water only 15 days, 11th to 26th. and) (received only 10000 ac. ft. during the period. Total) (inflow at Cheesman 20552 ac. ft.)	8444	2000	------
July	245	----	1090	(High Line received only 500 ac. ft. during month.)	----	----	-----
Aug.	62	----	210	(High Line received only 250 ac. ft. during month.)	----	----	-----
Sept.	----	----	2820	(Precipitation 58% normal, dry three months previous) (High Line received nothing.)	----	-----	-----
Oct.	62	----	1576	(High Line received no water until Oct. 31st.)	----	-----	-----
Nov.	120	3600	3608		3270	3610	3570
Dec.	----	930	906		62	910	922
	10808	16108	38862		19336	15290	12563

MONTH.	ACRE FEET. ACTUAL STORAGE.	ANDERSON.	COMSTOCK.	1904. NOTES.	ACRE FEET. FIELD.	BULL.	YEAR 5. ACRE FEET. FELLOWS.
Jan.	-----	248	218		218	220	246
Feb.	-----	348	368		368	370	345
March	2638	2666	2676		2638	2680	2410
April	891	1200	3794		3285	1500	3749
May	5289	5580	8260		5289	5100	8082
June	17406	17820	6070		----	15000	----
July	2207	2356	2150		176	5000	----
August	-----	----	14138	(High Line out all but 16th. to 22nd. and 28th. to 31st.) (receiving 3000 ac. ft. and a max. amount of only 150 sf.)	4190	-----	4137
Sept.	-----	760	7440	(High Line out all but 9th. to 15th. receiving 1200 ac.) (ft. with a max. of 125 s.f. and a min. of 30 s.f.)	2524	800	----
Oct.	1104	1464	8510	(Reservoir in process of filling and stored only 1104 ac.) (ft.)	1546	2000	2729
Nov.	4038	4080	4098		2994	4100	2218
Dec.	1410	1426	1444		1411	1440	1414
	34982	37968	59172		24639	38210	25330

MONTH.	ACRE FEET. ACTUAL STORAGE.	ACRE FEET. ANDERSON.	ACRE FEET. CONSTOCK.	1905. NOTES..	ACRE FEET. FIELD.	ACRE FEET. BULL.	YEAR 6. ACRE FEET. FELLOWS.
Jan.	----	620	636		636	640	-----
Feb.	997	1008	1032		1032	1030	1000
March	7610	7686	7714		7714	7710	7624
April	15147	15330	15296		15296	15300	15174
May	8407	28768	28756		28722	28750	28530
June	-----	24900	24454		19774	24890	11521
July	-----	-----	112		----	-----	-----
Aug.	-----	-----	314		----	-----	-----
Sept.	-----	4500	4832	(High Line received 800 ac. ft. from 23d. to 27th. and had no water since June 22nd. Demand about 1200 s.f. and supply about 550 s.f. for month. in Dist 2)	----	-----	-----
Oct.	-----	4216	4156	(Unsupplied demand in Dists. 2 and 8 entire month.)	----	-----	------
Nov.	-----	4320	4326		4326	4330	4284
Dec.	-----	992	990		990	990	------
	32158	92342	92618		78490	88640	68133

MONTH.	ACRE FEET. ACTUAL STORAGE.	ANDERSON.	COMSTOCK.	1906. NOTES.	ACRE FEET. FIELD	BULL.	YEAR 7. ACRE FEET. FELLOWS.
Jan.	----	310	298		298	300	----
Feb.	----	392	372		372	370	----
March	2883	3534	3558		3558	3560	3383
April	----	12840	12854		12518	12850	12734
May	----	15500	16408		16308	16420	16294
June	----	----	8986	(High Line out from 7th. to 11th. and 21th. to 24th. and 29th) (to 30th. Burlington received no water during the month.)	420	4600	----
July	----	----	6962	(High Line received between the 9th. and the 11th. and also between the 15th. and 20th. a total of 6000 ac. ft. (Burlington out all month, except 6 days).	----	----	----
Augu	----	-----	1630	(High Line out all month.)	----	----	----
Sept.	----	9000	15638	(High Line received 11500 ac. ft. max. 300 c.f. but out from 1st. to 3d. and 10th. to 15th. Last 13 days only were the demands supplied.)	5720	5180	2699
Oct.	----	18228	18184	(Actual excess in Dist. 8 amounts to 14000 ac. ft.)	13042	14200	13369
Nov.	----	12960	12966		12966	12970	12853
Dec.	----	5518	5510		5510	5510	5472
	2883	78282	103366		70712	75960	66804

1907.

MONTH.	ACRE FEET. ACTUAL. STORAGE.	ACRE FEET. ANDERSON.	ACRE FEET. COMSTOCK.	NOTES.	ACRE FEET. FIELD.	ACRE FEET. BULL.	YEAR 8. ACRE FEET. FELLOWS.
Jan.	----	3100	3124		3124	3120	3136
Feb.	----	3696	3686		3686	3690	3665
March	----	7192	7164		7164	7160	7133
April	----	1500	9746		8614	7672	9640
May	----	----	14706		8882	15670	13062
June	----	21000	29924		14132	29910	9969
July	----	24800	41650		17334	41630	17352
Aug.	----	24800	20630		6274	20310	9793
Sept.	----	6000	9052	(Demand exceeds supply entire month in Dist. 2.)	1224	770	----
Oct.	1779	3720	7878	(Only a small excess supply over demand.)	----	2428	----
Nov.	----	4140	4136		4016	4140	4106
Dec.	----	1674	1654		1654	1650	1660
	1779	101622	153360		76104	139150	79516

MONTH.	ACRE FEET. ACTUAL STORAGE.	ANDERSON.	COMSTOCK.	1908. NOTES.	ACRE FEET. FIELD	BULL.	YEAR 9. ACRE FEET. FELLOWS.
Jan.	----	620	614		614	620	----
Feb.	----	522	500		500	520	----
March	1228	4898	4924		4334	4900	4858.
April	----	----	6632		1416	----	6605
May	----	----	----		----	----	----
June	----	----	----		----	----	----
July	----	----	----		----	----	----
Aug.	----	----	2834	(D.U.W.Co drew 4793 ac. ft.from Cheesman. High Line re-) (ceived only 1000 ac. ft. In Dist 2 the supply was about) (750 s.f. and the demand about 1500 s.f.)	----	----	----
Sept.	----	----	690	(D.U.W.Co. drew 4098 ac.ft.from Cheesman. High Line no) (water all month. Demand in Dist. 8 double the supply.) (Demand in Dist. 2 trible the supply.)	----	----	----
Oct.	----	3534	3454	(D.U.W.Co. drew 980 ac. ft. from Cheesman.High Line re-) (ceived 40 to 75 s.f. for only one week. Burlington re-) (ceived no water all month.)	----	----	----
Nov.	2436	3360	3356		3356	3360	3332
Dec.	369	1178	1170		1170	1190	296
	4032	14112	24174		11390	10590	15091

MONTH.	ACRE FEET. ACTUAL STORAGE.	ANDERSON.	COMSTOCK.	1909. NOTES.	ACRE FEET. FIELD.	BULL.	YEAR 10. ACRE FEET. FELLOWS.
Jan.	186	992	994		64	1020	130
Feb.	----	1064	1038		30	1090	6---
March	2165	2644	2586		2516	2610	2582
April	14256	14700	14708		13238	14680	14579
May	4421	11160	10716		2924	11290	4386
June	----	24480	24326		7438	24240	-----
July	----	29574	26364		8794	22538	751
Aug.	----	34100	28246		15156	24134	20614
Sept.	----	52020	52010		50768	50520	51590
Oct.	----	20130	20452		17214	20580	20290
Nov.	----	8640	8626		8626	8640	8569
Dec.	----	6634	6630		6614	6570	6579
	20826	206158	196698		133282	187912	130070

MONTH.	ACRE FEET. ACTUAL STORAGE.	ANDERSON.	COMSTOCK.	1910. NOTES.	ACRE FEET. FIELD.	BULL.	YEAR 11. ACRE FEET. FELLOWS.
Jan.	----	4712	4722		4722	4770	4666
Feb.	----	1456	1458		1458	1670	1442
Maroh	983	18662	18674		18418	18370	18476
April	180	10560	10532		10532	10580	10455
May	----	4464	16302	(Burlington received water about half time. Shortage) (all month in Dist. 2.)	6216	----	10828
June.	----	----	3826	(D.U.W.Co. drew 771 ac. ft. from Cheesman. In Dist.8) (Last Chance was last ditch nearly all month. High) (Line no water except 800 ac. ft. but used 6000 ac.ft.) ~~(from Antero. Burlington no water.)~~	----	----	----
July	----	----	3998	(High Line drew 2000 ac.ft. direct and 2000 ac.ft. from) (Antero. 1885 ditches in Dist.2 last drawing water.)	1240	----	----
Aug.	----	----	4830	(D.U.W.Co. drew 3683 ac.ft. from Cheesman.High Line drew) (2000 ac.ft. direct and 2000 ac.ft. from Antero.In Dist.2) (supply two thirds of demand except two days.)	808	----	----
Sept.	----	----	----		----	----	----
Oct.	----	4030	3850	(High Line received water last few days. In Dist.2 the) (demand twice the supply.)	----	----	----
Nov.	297	4380	3860		3392	4400	3362
Dec.	----	1736	1748		622	1730	750
	1460	50000	73800		47400	41520	49979

MONTH.	ACRE FEET. ACTUAL STORAGE.	ACRE FEET. ANDERSON.	ACRE FEET. COMSTOCK.	1911. NOTES.	ACRE FEET. FIELD.	ACRE FEET. BULL.	YEAR 12. ACRE FEET. PEDLOWS.
Jan.	----	744	760		416	680	735
Feb.	----	1120	1134		494	1112	730
March	3745	4650	4624		4480	4500	4604
April	120	----	5740		2744	----	5703
May	----	----	1598	(High Line no direct flow, but drew 3500 ac.ft. from) (Antero. In Dist.2 Burlington received no water.)	----	----	-----
June	2493	----	6740	(High Line received 500 ac.ft. direct during 5 days of) (mo. Burlington no water all month.)	----	----	----
July	---	17484	22352	(High Line full demand for 8 days only. Burlington) (caught part of a peak of a flood for 3 days.)	----	----	----
Aug.	----	----	178		----	----	----
Sept.	----	----	2320	(No water for High Line or Burlington all month.)	----	----	----
Oct.	1903	2170	4586	(No water for High Line or Burlington all month.)	80	----	----
Nov.	----	2580	2550		1454	2520	524
Dec.	----	806	810		162	870	----
	8261	29554	53392		9830	9690	13296

MONTH.	ACRE FEET. ACTUAL STORAGE.	ACRE FEET. ANDERSON.	ACRE FEET. COMSTOCK.	1912. NOTES.	ACRE FEET. FIELD.	ACRE FEET. BULL.	YEAR 13. ACRE FEET. FELLOWS.
Jan.	----	682	654		104	650	104
Feb.	----	812	784		----	770	----
March	738	1984	1960		1470	1980	1422
April	7425	8100	8100		4884	8100	8019
May	10986	11718	10532		7328	11610	11600
June	8733	33300	33788		25968	33700	25065
July	----	43958	42178		17740	43800	20943
Aug.	----	28396	22252		9694	28100	11331
Sept.	----	8700	7420		120	8700	8----
Oct.	738	6386	6370		368	6770	----
Nov.	1308	8100	8070		7670	8040	8019
Dec.	----	1550	1530		1530	1550	1496
	29928	154286	143638		76876	153770	87999

MONTH.	ACRE FEET. ACTUAL STORAGE.	ANDERSON.	COMSTOCK.	1913. NOTES.	ACRE FEET. FIELD.	BULL.	YEAR 14. ACRE FEET. FELLOWS.
Jan.	----	806	778		778	775	799
Feb.	----	616	606		606	611	595
March	369	1178	1192		1192	910	1168
April	5058	16020	16036		15052	15240	15888
May	62	8494	8514		4106	8494	8424
June	----	15624	16454	(D.U.W.Co. drew 11000 ac.ft. from Cheesman.) (Burlington short.)	470	----	----
July	----	----	14584	(D.U.W.Co. drew 5700 ac.ft. from Cheesman.) (Supply and demand in Dists. 2 and 8 about equal.)	3604	----	- --
Aug.	7624	14012	19772	(Last Chance last ditch drawing in Dist. 8.) (Fulton last ditch drawing in Dist. 2.) (High Line and Burlington out of direct supply.)	1032	----	7199
Sept.	8271	9840	17918	(High Line 190 sec.ft. from 20th. to 30th. only.)	10608	3470	7680
Oct.	861	7826	8468		3236	8556	3888
Nov.	----	4740	4704		4688	4680	4641
Dec.	----	2790	2790		2534	2700	2767
	22245	81946	111816		47906	45436	53049

1355 Nye.

DEFENDANT'S EXHIBIT No. 47.

The Field, Fellows and Hinderlider Engineering Company.

Suite 435, 811 17th Street, Denver, Colorado, U. S. A.

Telephone, Main 4472.

Consulting and Supervising Engineers on Irrigation, Drainage, and Power Developments for Bond Houses and Contractors.

John E. Fields, M. Am. Soc. C. E.
M. C. Hinderlider, M. Am. Soc. C. E.
H. A. Storrs, M. A. I. E. E. & Am. Soc. C. E.
A. Lincoln Fellows, M. Am. Soc. C. E.
S. D. Gromer, Ass't Sec. & Treas.

1356 *A Comparison of Estimates of Available Storage at Lake Cheesman.*

NOTE.—Estimates by Anderson, Comstock and Bull do not allow for a demand by the Denver Union Water Company's direct flow rights when water could be stored in Lake Cheesman.

Estimates by Field and Fellows allow a demand for the direct flow rights at the Canon.

Assumptions:

Anderson: Method not explained.

Comstock: Average supply of past years assumed to be a satisfactory future supply.

Field: Estimates of monthly demands made from the Water Commissioners' reports.

Bull: Conditions as reported by Water Commissioners used to determine the available storage during the periods governed by the reports.

Fellows: Demand of year 1913 assumed as future minimum normal demand.

Notes introduced are taken from the reports of Water Commissioners, in substance as to conditions and quantities.

(Here follow tabular statements marked pages 1357 to 1370.)

1371 *Summary of Estimates of Available Storage at Lake Cheesman.*

Year.	Anderson.	Comstock.	Field.	Bull.	Year No.	Fellows.
1900....	169,578	.....	.....	.....	1	126,188
1901....	66,182	.....	.....	63,220	2	48,458
1902....	10,962	15,876	11,882	8,340	3	12,942
1903....	16,108	38,862	19.336	15,290	4	12,563
1904....	37,968	59,172	24,639	38,210	5	25,330
1905....	92,342	92,618	78,490	83,640	6	68,133
1906....	78,282	103.366	70,712	75,960	7	66,804
1907....	101,622	153,360	76,104	138,150	8	79,516
1908....	14,112	24,174	11,390	10,590	9	15,091
1909....	206,138	196.698	133,282	187,912	10	130,070
1910....	50,000	73,800	47.408	41,520	11	49,979
1911....	29,554	53,392	9,830	9,690	12	12,296
1912....	154,286	143,638	76,876	153,770	13	87,999
1913....	81.946	111.816	47,906	45,436	14	53,049
Ave.....	79,220	88,897	50,655	67,056		56,316
	Year's Storage Limited to Capacity of 79,064 *Acre Feet.*					
Ave.....	55,539	61,639	46,137	48,039		48,636

(Endorsed:) 6274. U. S. District Court, District of Colorado. Defendants' Exhibit #47. Filed Oct. 6, 1915. Charles W. Bishop, Clerk.

1372

DEFENDANT'S EXHIBIT No. 54.

Extensions and Corrections of Defendant's Exhibits Nos. 19 and 25 and Comparative Statement of Valuations.

THE DENVER UNION WATER COMPANY
vs.
THE CITY AND COUNTY OF DENVER.

E. C. Van Diest, Consulting Engineer, Colorado Springs, Colorado, U. S. A.

1373

DEFENDANT'S EXHIBIT No. —.

Extensions and Corrections of Defendant's Exhibits Nos. 19 and 25 and Comparative Statement of Valuations.

THE DENVER UNION WATER COMPANY
vs.
THE CITY AND COUNTY OF DENVER.

1374

Sheet No. 1.

DEFENDANT'S EXHIBIT No. 19.

Valuation.

SCHEDULE A.

Lands—Jefferson County.

No. of tract.	Acres.	Land values.	Improvements.	Total value.	Remarks.
1.....	216.65	1,083.00	400.00	1,483.00	Platte Canon
2.....	3.22	260.00	.....	260.00	Filter Beds
3.....	11.06	620.00	.....	620.00	" "

No. of tract.	Acres.	Land values.	Improvements.	Total value.	Remarks.
4.....	22.99	700.00	.....	700.00	Office, Etc.
5.....	19.95	1,300.00	.....	1,300.00	Gallery lands above Lehow Lake.
6.....	53.00	265.00	150.00	415.00	at diversion, etc., in Canon.
7*a*.....	3,880.00	9,700.00	.....	15,509.00	Lake Cheesman
7*b*.....	232.36	5,809.00			
8.....	8.37	6,750.00	.....	6,750.00	Ashland Ave. Res.
9.....	4 lots	400.00	.....	400.00	" " Pumping Station.
10.....	7 lots	525.00	.....	525.00	Additional Lands.
11.....	88.03				
12.....	.21				
13.....	106.67				
14*a*.....	30.00				
14*b*.....	25.00				
14*c*.....	265.00				
15.....	28.44				
16.....	28.59				
17.....	6.57	124,160.00	840.00	125,000.00	Marston Lake Land.
18.....	120.90				
19.....	16.84				
20.....	67.28				
21.....	8.28				
22.....	2.45				
23.....	42.11				
24.....	1.71				
25.....	2.14				
				152,962.00	

Sheet No. 2.

DEFENDANT'S EXHIBIT No. 19.

Valuation.

SCHEDULE A.

Lands—Jefferson County.

No. of tract.	Acres.	Land values.	Improvements.	Total value.	Remarks.
26	11.84	592.00	100.00	692.00	Dam & Headgate Harriman Ditch
27	3.50	.....			
28	6.50	3,640.00			
29	81.00	.....	.....	5,000.00	Harriman Lake
30	39.00	1,360.00			
32	3.03	.....			
33	3.03	250.00	250.00	500.00	Marston Lake Flume
34	1.52	.....			
35*a*	260.00	32,500.00			
35*b*	160.00	800.00	15,000.00	52,490.00	Frank Archer
35*c*	167.60	4,190.00			
36*a*	100.00	12,500.00			
36*b*	17.00	170.00			
36*c*	12.00	900.00	800.00	14,826.00	Becky Archer
36*d*	16.00	400.00			
36*e*	5.60	56.00			

37*a*	15.00	750.00			
37*b*	25.00	3,150.00			
37*c*	27.00	3,375.00			
37*d*	50.00	750.00	1,500.00	22,538.00	Wm. Strong
37*e*	95.00	11,875.00			
37*f*	25.00	350.00			
37*g*	39.40	788.00			
38*a*	103.00	12,875.00			
38*b*	67.00	1,005.00	1,200.00	16,730.00	Phebe Strong
38*c*	15.00	150.00			
38*d*	15.00	1,500.00			
39	320.00	1,600.00	850.00	2,450.00	Phebe Strong
40	80.00	400.00	.....	400.00	" "
41	80.00	400.00	.....	400.00	" "
				116,026.00	

Sheet No. 3.

DEFENDANT'S EXHIBIT No. 19.

Valuation.

SCHEDULE A.

Lands—Jefferson County.

No. of tract.	Acres.	Land values.	Improvements.	Total value.	Remarks.
42	13.08	400.00	25.00	425.00	Lehow Lake
43	170.00	850.00			
44	320.00	1,600.00	250.00	4,300.00	Mountain Res.
45	320.00	1,600.00			
46	9.20				
47	2.00				
48	3.00				
49	12.40				
50	4.28				
51	3.50				
52	5.80				
53	9.15				
54	3.65	4,070.00	300.00	4,370.00	Conduit Lines. Lands owned in fee.
55	2.30				
56	2.77				
57	5.88				
58	3.05				
59	9.11				
60	1.52				
61	3.04				
62	.76				
Rights of Way		3,815.00	.....	3,815.00	
				12,910.00	

DEFENDANT'S EXHIBIT No. 19.

Valuation.

SCHEDULE A.

Lands—Arapahoe County.

Sheet No. 4.

No. of tract.	Acres.	Land values.	Improvements.	Total value.	Remarks.
1.....	20 lots	2,800.00	.....	2,800.00	Residence in Littleton
2.....	1.10	25.00			Oakdale
3.....	55.00	1,000.00			"
4.....	34.53	700.00	2,000.00	6,125.00	"
5.....	16.10	800.00			"
6.....	40.31	1,600.00			"
7.....	80.00	1,000.00	.....	1,000.00	Sullivan
8.....	11.18	.....	.....	sold	Caley
9.....	1.15				
10.....	3.00				
11.....	5.50				
12.....	.53				
13.....	4.52				
14.....	3.22				
15.....	20.00	2,450.00	50.00	2,500 00	Conduit lands owned in fee.
16.....	1.51				
17.....	2.10				
18.....	2.34				
19.....	1.17				
20.....	1.94				
23.....	2.38	100.00	.....	100.00	" " "
24.....	3.50	2,500.00	.....	2,500.00	Littleton Mill
25.....	10.00	1,000.00	50.00	1,050.00	" "
				16,075.00	

Sheet No. 5.

DEFENDANT'S EXHIBIT No. 19.

Valuation.

SCHEDULE A.

Lands—Douglas County.

No. of tract.	Acres.	Land values.	Improvements.	Total value.	Remarks.
1.....	3.60	36.00	25.00	61.00	Wm. Strong Ranch
2.....	9.40	94.00	25.00	119.00	Becky Archer
3.....	90.00	450.00	175.00	625.00	Dodge & Jackson
4.....	7.77	100.00	25.00	125.00	Platte Canon
5.....	85.25	5,115.00	200.00	5,315.00	Reservoir
6.....	10.30	618.00	75.00	693.00	
7.....	99.62	500.00	.....	500.00	Stone Placer
8.....	3,680.00 643.60	9,200.00 16,090.00	....	..... 25,290.00	Cheesman

Total	32,728.00
Total of page 1, Schedule A	152,962.00
Total of page 2, Schedule A	116,026.00
Total of page 3, Schedule A	12,910.00
Total of page 4, Schedule A	16,075.00
Total of Schedule A	330,701.00

Sheet No. 6.

DEFENDANT'S EXHIBIT No. 19.

Valuation.

SCHEDULE B.

Lands—City and County of Denver.

No. of tract.	Acres.	Land values.	Improvements.	Total value.	Remarks.
1.....	1 lot	Sold	.....	Sold	W. 11th Ave.
2.....	Fr. lots	450.00	.....	450.00	De Lappe Pl.
3.....	B 19 5 lots	1,920.00 130.00	.....	2,050.00	Cottage Hill Tank Site
4.....	2 lots	500.00	.....	500.00	Highland Park
5.....	33 lots 5 lots 8 lots	1,680.00 195.00 150.00	.....	2,025.00	Cottage Hill, Etc.
6.....	24 lots	240.00	.....	240.00	Cottage Hill Residence.
7.....	14 Fr. lots	1,000.00	.....	1,000.00	Univ. Park Pump
8.....	4 lots	200.00	.....	200.00	" " Tank
9.....	9.25	29,600.00	.....	29,600.00	West Denver Pump Plant
10.....	1.65	2,460.00	.....	2,460.00	Tail Race
11.....	1.20	1,920.00	.....	1,920.00	" "
12.....	.64	1,025.00	.....	1,025.00	" "
13.....	1.90	3,040.00	.....	3,040.00	" "
14.....	3 lots	1,090.00	.....	1,090.00	Pump. Plant
15.....	1 acre	3,200.00	.....	3,200.00	" "
16.....	.21	670.00	.....	670.00	" "

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EXTEND
S

EST

OF THE PROPERTY OF THE DENVER UNION WATER CO
NOVEMBER 1st, 1913, CONSIDERED NECESSARY TO

Schedule	Description	Original Totals	Corrected Totals
A.	Lands outside the City	323,736.00	330,701.00
B.	Lands inside the City	173,040.00	182,900.00
C.	Structures	2,117,005.35	1,988,547.89
D.	Infiltration Galleries	102,376.24	102,672.82
E.	Conduits	2,038,724.41	2,038,544.89
F.	Mechanical Equipment	494,478.66	415,865.81
G.	Distribution System	4,016,369.38	4,009,900.85
H.	Buildings, Etc..	338,100.03	365,657.28
I.	Stock	111,132.81	111,132.81
K.	Miscellaneous	92,927.21	100,129.34
	Development Expense	375,628.00	375,628.00
		10,183,518.09	10,021,680.69

Net Difference Decrease..... 161,837.40

Total corrected estimated value all property "Going Value", and "Rights of Carriage of Water" not included.....10,021,680.69

Deductions as per list, property not essential, or obsolete..... 139,946.84

Total estimated corrected value of property needed by City: "Going Value" and "Rights of Carriage of Water" not included.. 9,881,733.85

NOTE: Difference in value of deductions is due to difference in va as per Corrected Schedules of Harriman Reservoir and Improve on Littleton Lots.

Sheet No. 6-A
Defendant's Exhibit No. 19

EXTENDED AND CORRECTED
SUMMARY
OF
ESTIMATED VALUE

THE PROPERTY OF THE DENVER UNION WATER COMPANY, AND THE SOUTH PLATTE CANAL & RESERVOIR COMPANY, AS OF EMBER 1st, 1913, CONSIDERED NECESSARY TO THE OPERATIONS OF THE WATER SYSTEM, PRESENT AND PROSPECTIVE.

	Original Totals	Corrected Totals	Difference Increase	Difference Decrease	Deductions List Attached
City	323,736.00	330,701.00	6,965.00		15,300.00
City	173,040.00	182,900.00	9,860.00		4,700.00
	2,117,005.35	1,988,547.89		128,457.46	8,243.04
eries	102,376.24	102,672.82	296.58		
	2,038,724.41	2,038,544.89		179.52	
ent	494,478.66	415,865.81		78,612.85	95,000.00
em	4,016,369.38	4,009,900.85		6,468.53	11,491.48
	338,100.03	365,657.28	27,557.25		5,212.32
	111,132.81	111,132.81			
	92,927.21	100,129.34	7,202.13		
se	375,628.00	375,628.00			
	10,183,518.09	10,021,680.69	51,880.96	213,718.36	139,946.84
.....	161,837.40				

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.....10,021,680.69
5.

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ncluied.. 9,881,733.85

e of deductions is due to difference in valuation
chedules of Harriman Reservoir and Improvements

SCHEDULE -C-
EXTENDED AND CORRECTED
S T R U C T U R
VALUATION AS OF NOVEMBER 1, 1913. BY ENGINEERS

	Replacement Cost	%	Engineering	Contractor's Profit 15%	S
Marston Lake Filter	42,138.55	5	2,106.93	6,320.78	5
Marston Lake Tools & Equip.	2,977.76	10	297.78		
Marston Lake Material	768.52				
Bear Creek Division	24,337.82	5	1,216.89	3,650.67	2
Ashland Ave.Reservoir (2)	37,634.99	5	1,881.75	5,645.25	4
Cottage Hill & University Tank Foundations	7,412.18	5	370.61		
Tanks and Stand Pipes	18,200.00	5	910.00		1
So. Platte River Division	298,173.77	5	14,908.69	44,726.07	35
Crocker Schedule	14,804.62	10	1,480.46		1
Willard Filters	48,150.00	5	2,407.50	7,222.50	5
Capitol Hill Reservoir	23,044.53	5	1,152.23	3,456.68	2
Capitol Hill Res. Lining	21,596.52	5	1,079.83	3,239.48	2
Cheesman Reservoir	822,501.20	10	82,250.12	81,667.68	98
Marston Lake Reservoir	222,108.84	5	11,105.44	33,316.32	26
West Denver Reservoir	11,370.09	5	568.50	1,605.50	1
Lake Archer	46,065.99	5	2,303.30	6,909.90	5
Harriman Lake	6,928.19	5	346.29	1,038.87	
Wynetka Miscellaneous	89.40	5	4.47	13.41	
	1,648,302.97		124,390.79	198,813.11	1,97
NOTE: Miscellaneous items and omissions appear in General Schedule F as fo					
	1,686.14		84.31	252.92	

Spur Tracks at West Denver Station, 1743 ft. long, omitted from orig of $2,574.00.

In certain items of Replacement Cost, Contractor's Profit is include

SCHEDULE -C-
EXTENDED AND CORRECTED SUMMARIES
S T R U C T U R E S.
1, 1913. BY ENGINEERS OF DENVER PUBLIC UTILITIES COMMISSION.

ing	Contractor's Profit 15%	Sub-Total	Int. %	Interest Amount	Total Replacement Value	% Deprec.	Amount Depreciation	Net Value
3	6,320.78	50,566.26	3	1,516.99	52,083.25	14.29	7,442.70	44,640.55
8		3,275.54			3,275.54	35.00	1,146.44	2,129.10
		768.52			768.52			768.52
9	3,650.67	29,205.32	2	584.11	29,789.49	29.65	8,832.58	20,956.91
5	5,645.25	45,161.99	2	903.24	46,065.23	2.77	1,275.21	44,790.02
1		7,782.79	2	155.66	7,938.45	2.08	165.12	7,773.33
0		19,110.00	2	382.20	19,492.20	12.69	2,473.56	17,018.64
9	44,726.07	357.808.53	3	10,734.26	368,542.79	9.95	36,670.01	331,872.78
6		16,285.08	2	325.70	16,610.78	2.78	461.78	16,149.00
0	7,222.50	57,780.00	2	1,155.60	58,935.60	19.50	11,492.44	47,443.16
3	3,456.68	27,653.44	3	829.60	28,483.04	3.35	954.18	27,528.86
3	3,239.48	25,915.83	2	518.32	26,434.15	3.35	885.54	25,548.61
2	81,667.68	986,419.00	8	78 ,913.52	1,065,332.52	0.86	9,161.86	1,056.170.66
4	33,316.32	266,530.60	3	7,995.92	274,526.52	1.35	3,706.10	270,820.42
0	1,605.50	13,544.09	2	270.88	13,814.97	4.29	592.66	13,222.31
0	6,909.90	55,279.19	2	1,105.58	56,384.77	5.36	3,022.22	53,362.55
8	1,038.87	8,313.35	2	166.27	8,479.62	2.79	236.58	8,243.04
7	13.41	107.28	2	2.15	109.43			109.43
	198,813.11	1,971,506.87		105,560.00	2,077,066.87		88,518.98	1,988,547.89
ral	Schedule F as follows:							
	252.92	2,023.37	3	60.70	2,084.07	5.00	104.20	1,979.87

g, omitted from original report, have been included under W. D. Reservoir at Replacement Cost

's Profit is included, and is not separately shown included in amount in Column 3.

SCHEDULE -E-
EXTENDED AND CORRECTED
S U M M A R I E S

CONDUITS

VALUATION AS OF NOVEMBER 1, 1913, BY ENGINEERS OF DENVER PUBLIC UTILITIES COMMISSION.

		Replacement Cost	Engineering 5%	Contractor's Profit 12-1/2%	Sub-Total	Interest 5%	Total Replacement Value	% Deprec.	Depreciation Amount	Net Value
Conduit	No.1	323,020.38	16,151.00	40,377.57	379,548.95	18,977.45	398,526.40	13.52	43,672.36	354,854.04
"	No.2	232,698.97	11,634.95	29,087.37	273,421.29	13,671.06	287,092.35	20.01	46,563.06	240,529.29
"	No.3	257,659.96	12,882.99	32,207.97	302,750.92	15,137.55	317,888.47	15.11	38,932.42	278,956.05
"	No.4	59,596.78	2,979.84	7,449.60	70,026.22	3,501.31	73,527.53	2.96	1,764.06	71,763.47
"	No.5	74,214.13	3,710.71	9,276.76	87,201.60	4,360.08	91,561.68	3.39	2,515.86	89,045.82
"	No.6	279,391.42	13,969.57	34,923.93	328,284.92	16,414.25	344,699.17	2.14	5,978.98	338,720.19
"	No.5 Ext.	20,162.05	1,008.10	2,520.26	23,690.41	1,184.52	24,874.93	31.27	6,304.67	18,570.26
"	No.7	191,411.14	9,570.56	23,926.39	224,908.09	11,245.40	236,153.49	1.77	3,387.98	232,765.51
"	No.8	171,400.06	8,570.00	21,425.01	201,395.07	10,069.75	211,464.82	0.66	1,131.24	210,333.58
"	No.8 Ext.	14,316.74	715.84	1,789.59	16,822.17	841.11	17,663.28	0.79	113.10	17,550.18
Misc.Conduits	A	8,359.05	417.95	1,044.88	9,821.88	491.09	10,312.97	5.50	459.75	9,853.22
" "	B	4,763.22	238.16	595.40	5,596.78	279.84	5,876.62	8.24	392.49	5,484.13
" "	C	2,092.84	104.64	261.61	2,459.09	122.95	2,582.04	31.33	655.69	1,926.35
" "	D-1	47,873.18	2,393.66	5,984.15	56,250.99	2,812.55	59,063.54	3.59	1,718.65	57,344.89
" "	D2	26,812.96	1,340.65	3,351.62	31,505.23	1,575.26	33,080.49	1.12	300.31	32,780.18
" "	D-3	1,962.41	98.12	245.30	2,305.83	115.29	2,421.12	0.44	8.63	2,412.49
" "	D-4	12,959.84	647.99	1,619.98	15,227.81	761.39	15,989.20	22.95	2,974.28	13,014.92
" "	D-5	4,730.22	236.51	591.28	5,558.01	277.90	5,835.91	0.23	10.98	5,825.03
" "	D-6	41,420.97	2,071.05	5,177.62	48,669.64	2,433.48	51,103.12	1.37	567.47	50,535.65
"		5,159.17	257.96	644.89	6,062.02	303.10	6,365.12	1.34	85.48	6,279.64
		1,780,005.49	89,000.25	222,501.18	2,091,506.92	104,575.33	2,196,082.25		157,537.36	2,038,544.89

NOTE: - Corrections for this Schedule appear under Schedule K as follows:

	27,450.22	1,372.51	3,431.28	32,254.01	1,612.70	33,866.71	4.1	1,388.54	32,478.17

SCHEDULE -F-
EXTENDED AND CORRECTED
SUMMARIES,
MECHANICAL EQUIPMENT.
VALUATION AS OF NOVEMBER 1, 1913, BY ENGINEERS OF DENVER PUBLIC UTILITIES COMMISSION.

	Replacement Cost	Engineering 5%	Contractor's Profit 15%	Sub-Total	Interest 3%	Total Replacement Value	% Depre.	Depreciation Amount	Net Value
Ashland Avenue	35,280.40	1,764.02	5,292.06	42,336.48	1,270.09	43,606.57	9.9	4,317.05	39,289.52
Capitol Hill	74,454.95	3,722.75	11,168.24	89,345 94	2,680.38	92,026.32	10.1	9,294.66	82,731.66
Cheesman Lake	14,825.52	741.28	2,223.82	17,790 62	533.72	18,324.34	16.6	3,041.84	15,282.50
Littleton Mill	8,063.18	403.16	1,209.48	9,675.82	290.27	9,966.09	44.0	4,385.08	5,581.01
Montclair Booster	2,688.94	134.45	403.34	3,226.73	96.80	3,323.53	9.7	322.38	3,001.15
Platte Canon Filter	60,384.83	3,019.24	9,057.72	72,461.79	2,173.85	74,635.64	11.1	8,284.56	66,351.08
Platte Canon Headgate	3,452.68	172.63	517.90	4,143.21	124.30	4,267.51	2.1	89.62	4,177.89
Union Park	10,451.36	522.57	1,567.70	12,541.63	376.25	12,917.88	12.6	1,627.65	11,290.23
West Side Pumping Station	170,600.72	8,530.04	25,590.11	204,720 87	6,141.63	210,862.50	19.5	41,118.19	169.744.31
Willard Filter	6,407.03	320.35	961.05	7,688.43	230.65	7,919.08	34.8	2,755.84	5,163.24
Wynetka Meter	8,562.14	856.21		9,418.35	282.55	9,700.90	4.3	417.14	9,283.76
Street Outfits	4,811.46	481.15		5,292.61		5,292.61	25.0	1,323.15	3,969.46
	399,983.21	20,667.85	57,991.42	478,642.48	14,200.49	492,842.97		76,977.16	415,865.81

SCHEDULE -G-
EXTENDED AND CORRECTED
S U M M A R I E S,
DISTRIBUTION SYSTEM.
VALUATION AS OF NOVEMBER 1, 1913, BY ENGINEERS OF DENVER PUBLIC UTILITIES COMMISSION.

	Replacement Cost	Engineering 10%	Contractor's Profit-15%	Sub-Total	Interest 8.2%	Total Replace. Value	% Deprec.	Amount Depreciation	Net Value
General Schedule	3,287,693.79	338,769.38	508,154.07	4,234,617.24	355,707.85	4,590.325.09	12.91	600,663.75	3,989.661.34
Valve Pits	4,597.29	459.73	689.60	5,746.62	465.47	6,212.09	9.76	606.30	5,605.79
River & Bridge Crossings	12,425.18	1,243.52	1,865.28	15,543.98	1,259.06	16,803.04	12.91	2,169.32	14,633.72
	3,404,726.26	340,472.63	510,708.95	4,255,907.84	357,432.38	4,613.340.22		603,439.37	4,009.900.85

NOTE: - The Depreciation amount on the General Schedule includes two changes as follows:

Item No. 1 - Wood Stave Pipe

The 24" pipe (2552 Lin.ft.) on West Alameda Ave. between Zuni Street and Federal Blvd., was listed as Cast Iron -- Should have been listed as Wood Stave Pipe.

	Replacement Value	Depreciation	Net Value
2552 lin. ft. C. I. Pipe	$10,322.70	$345.81	$9,976.89
2552 " " Wood Stave Pipe	2,883.70	456.20	2,427.50
		Net Credit	$7,549.39

Both of these Credit items were included with Depreciation on the General Schedule, to avoid the necessity of changing the lists and schedules, which had been completed before these errors were found.

Item No. 2 - 24" Steel Pipe.

The 2,582 lin. ft. of 24-inch pipe, laid on South Clarkson Street, between Iliff and Yale Avenues, were listed as Cast Iron Pipe, but should have been Matheson Steel Pipe:
Difference in price per lin. ft. in place:

2,582 lin. ft. C. I. Pipe		$10,466.06
2,582 lin. ft. Steel Pipe		10,057.47
	Credit	$ 408.59

Depreciation General Schedule	$592,705.77
Correcting Item No. 1	7,549.39
Correcting Item No. 2	408.59
	$600,663.75

SCHEDULE -H-
EXTENDED AND CORRECTED
S U M M A R I E S,
BUILDINGS, ETC.
VALUATION AS OF NOVEMBER 1, 1913, BY ENGINEERS OF DENVER PUBLIC UTILITIES COMMISSION

	Replacement Cost	Engineering 5%	Sub-Total	Interest During Cons. 3%	Total Replacement Value	Depreciation Amount	% of Depre.	Net Value
Ashland Avenue	58,469.51	2,923.47	61,392.98	1,841.79	63,234.77	19,581.91	30.967	43,652.86
Capitol Hill	65,504.69	3,275.23	68,779.92	2,063.40	70,843.32	13,286.65	18.755	57,556.67
Lake Cheesman	11,359.94	568.00	11,927.94	357.84	12,285.78	1,813.50	14.761	10,472.28
Littleton Buildings-(All)	21,769.69	1,088.48	22,858.17	685.74	23,543.91	5,993.10	25.455	17,550.81
Marston Lake	30,600.63	1,530.03	32,130.66	963.92	33,094.58	5,919.30	17.886.	27,175.28
Montclair Booster	401.78	20.09	421.87	12.66	434.53	65.18	15.000	369.35
Platte Canon Filter	81,182.73	4,059.14	85,241.87	2,557.26	87,799.13	7,309.28	8,325	80,489.85
University Park	3,515.72	175.79	3,691.51	110.74	3,802.25	60.57	1,593	3,741.68
West Denver	102,519.56	5,125.98	107,645.54	3,229.37	110,874.91	17,512.69	15,795	93,362.22
Willard Filter	24,596.32	1,229.82	25,826.14	774.78	26,600.92	6,332.08	23.804	20,268.84
Wynetka Meter	10,696.67	534.83	11,231.50	336.94	11,568.44	551.00	4,763	11,017.44
	410,617.24	20,530.86	431,148.10	12,934.44	444,082.54	78,425.26	17.665	365,657.28

NOTE: Contractor's Profit is included, as valued by Mr. Brown, under Replacement Cost, Column 1, and is, therefore, not separately shown.

SCHEDULE -K-

SUMMARIES OF MISCELLANEOUS ITEMS OF STOCK AND CORRECTIONS, ADDITIONS TO OTHER SCHEDULES.

VALUATION AS OF NOVEMBER 1, 1913, BY ENGINEERS OF DENVER PUBLIC UTILITIES COMMISSION.

Item No.		Replacement Cost	Engineering 5%	Contractor's Profit 15%	Sub-Total	Interest %	Interest Amount	Total Replacement Value	% Deprec.	Depreciation	Net Value
1.	Ranch Equipment Platte Canon	5,199.30			5,199.30			5,199.30	40	2,079.72	3,119.58
2.	Ranch Stock Platte Canon	13,498.50			13,498.50			13,498.50	10	1,349.85	12,148.65
3	Ranch Equipment Platte Canon	4,134.22			4,134.22			4,134.22	35	1,446.98	2,687.24
4.	Ranch Equipment Platte Canon	5,365.00			5,365.00			5,365.00	10	536.50	4,828.50
5.	Office Equipment, Etc.	19,947.25			19,947.25			19,947.25	40	7,978.90	11,968.35
6.	Automobiles (9)	15,059.00			15,059.00			15,059.00	60	9,035.40	6,023.60
7.	Yard Material	6,209.86			6,209.86			6,209.86	25	1,552.46	4,657.40
8.	Telephone Lines Lake Cheesman	4,399.00	219.95		4,618.95	2	92.38	4,711.33	20	942.27	3,769.06
9.	Telephone Lines, Miscellaneous	2,655.54	132.78		2,788.32	2	55.77	2,844.09	17.8	506.25	2,337.84
10.	Miscellaneous Items	1,686.14	84.31	252.92	2,023.37	3	60.70	2,084.07	5	104.20	1,979.87
11.	Correction for Schedule E	27,450.22	1,372.51	4,117.53	32,940.26	5	1,647.01	34,587.27	4.1	1,418.08	33,169.19
12.	Miscellaneous Schedule Equip.	26,880.13			26,880.13			26,880.13	50	13,440.07	13,440.06
		132,484.16	1,809.55	4,370.45	138,664.16		1,855.86	140,520.02		40,390.68	100,129.34

NOTE: - Items 10 and 11 are corrections of Schedules C and E. The same relative amount of Engineering, Contractor's Profit and Interest during Construction, was omitted from original schedule and included herein.

Items 8, 9 and 10, Telephone Lines, under Replacement Cost, include Contractor's Profit.

Interest during Construction on all other items under this Schedule included in Development Expense.

EXTENDED AND CORRECTED

GENERAL SUMMARY

OF

VALUATION OF PHYSICAL ELEMENTS OF THE PROPERTY OF THE DENVER UNION WATER COMPANY

AS OF NOVEMBER 1st, 1913.

Schedule	Replacement Cost	Engineering	Contractor's Profit	Interest	Reproduction Value	Depreciation	Net Value
A.	330,701.00				330,701.00		330,701.00
B.	182,900.00				182,900.00		182,900.00
C.	1,648.302.97	124,390.79	198,813.11	105,560.00	2,077,066.87	88,518.98	1,988,547.89
D.	102,921.56	7,719.12	15,438.23	3,782,37	129,861.28	27,188.46	102,672.82
E.	1,780,005.49	89,000.25	222,501.18	104,575.33	2,196.082.25	157,537.36	2,038,544.89
F.	399,983.21	20.667.85	57,991.42	14,200.49	492,842.97.	76,977.16	415,865.81
G.	3,404,726.26	340,472.63	510,708.95	357,432.38	4,613,340.22	603,439.37	4,009,900.85
H.	410,617.24	20,530.86		12,934.44	444,082.54	78.425.26	365,657.28
I.	111,132.81				111,132.81		111,132,81
K.	132,484.16	1,809.55	4,370.45	1,855.86	140,520.02	40,390.68	100,129.34
Estimated Development Exp.							375,628.00
	8,503,774.70	604,591.05	1,009,823.34	600,340.87	10.718,529.96	1,072,477.27	10,021,680.69

1390 DEFENDANT'S EXHIBIT No. 25.

Page 1.

Deductions from the valuation of the property of The Denver Union Water Company claimed by defendants as excessive, or for property not essential to the operation of the system, or not properly included in a rate case.

Valuation of all property of The Denver Union Water Company, as per Plaintiff's Exhibit C, p. 64		$16,038,379.00
Deductions:		
1. Difference in valuation of water rights, based on difference in quantity between "safe yield" claimed and the average daily consumption for a maximum year, in second feet, plus evaporation and seepage and plus farm use, at $6,000. per second ft., being $3,530,000 less $565,980.00	$2,964,020.	
2. Going Concern Value	1,200,000.	
3. Schedule A, p. 2, Unused, Unnecessary and obsolete property	622,289.	
4. Schedule B, p. 6, Difference in value of distributing system between 1913 valuation of Utilities Commission and Plaintiff's Exhibit C, including Corporation Cocks	601,765.	
5. Schedule C, p. 7, difference between the valuation of the Utilities Commission Engineers and Plaintiff's Exhibit C, on Miscellaneous Stock Account, etc.	64,727.	
6. Depreciation for 5 months from Oct. 31, 1913, to May 1, 1914, $56,665. less $10,981., (Plaintiff's Exhibit Z)	45,684.	
7. Paving over mains (as included in the valuation of distributing system by Utilities Commission Engineers)	504,310.	
8. Schedule D, p. 8, Net Difference in land valuations between Plaintiff's Exhibit C and Defendant's Exhibit 19, exclusive of Specific Deductions	236,496.	
Total Deductions		$6,239,291.00
Net value of Serviceable Property for Rate Making Purposes		$9,799,088.00

1391 DEFENDANT'S EXHIBIT NO. 25.

Page 2.

Schedule A.

Eliminations from Valuation of the Property of The Denver Union Water Company as Unnecessary or Obsolete, Valuations from Plaintiff's Exhibit C and Exhibit A-23.

1. Sullivan Reservoir	$133,693.00
2. Platte Canon Pumps (Schedule A-1)	31,610.00
3. West Denver Station (Schedule A-2)	112,152.00
4. Harriman Reservoir	12,807.00
5. Littleton Residence and Stables	7,576.00
6. Lands (Schedule A-3)	324,451.00
	$622,289.00

1392 DEFENDANT'S EXHIBIT NO. 25.

Page 3.

Schedule A-1.

Eliminations from Plaintiff's Exhibit C, Valuations from Plaintiff's Exhibit C, Pipe, Valves, Fittings Estimated Proportionately.

Platte Canon Pumping Plant—Valuations Metcalf & Anderson, p. 19 and sequent reports:

Units 1, 2, 3, and 5 (4 left for sand pumps)	$12,519.00
Items 6, 7 and 8	5,500.00
1 Boiler and Oven	2,797.00
Breeching 1 Boiler	330.00
C. I. Suction and Discharge Piping	6,122.00
Miscellaneous equipment, valves, steam piping and connections, etc., estimated	2,000.00
	29,268.00
Add Engineering and Contingencies, 12½%	3,658.00
	32,926.00
Add Interest during construction, 8%	2,634.00
	35,560.00
Deduct Depreciation	3,950.00
Total Value for Deduction	$31,610.00

1393 DEFENDANT'S EXHIBIT No. 25.

Page 4.

Schedule A-2.

Eliminations from Plaintiff's Exhibit C, Valuations from Plaintiff's Exhibit C, Pipe, Valves, Fittings Estimated Proportionately.

West Denver Station:		
Lake Archer and Canal (except water right and lands) Value from Exhibit A-23.....		$66,683.00
Items A-1-2-4, p-. 315, 316, Plaintiff's Exhibit C, $127,050, less $66,550.....	$60,500.00	
B-1 to 4.....	3,390.00	
Appurtenant pipe, valves and fittings, estimated proportionately.....	6,010.00	
	69,900.00	
Add Engineering and Contingencies, 12½%.....	8,437.00	
	78,337.00	
Add Interest during Construction, 8%...	6,267.00	
	84,604.00	
Deduct depreciation.....	39,135.00	45,469.00
Total Value for Deduction....		$112,152.00

Lake Archer Power Right not separately valued or included in water valuation under "Safe Yield," p. 13, Plaintiff's Exhibit C.

1394 DEFENDANT'S EXHIBIT No. 25.

Page 5.

Eliminations Schedule A-3. Lands Not Essential to the System of The Denver Union Water Company, Valuations and Reference Numbers from Plaintiff's Exhibit C.

Item No. 9	Phebe Strong Ranch.....	680	acres	$18,080.00
" 10	Part of William Strong Ranch	240	"	15,000.00
" 11	Becky Archer Ranch.....	160	"	13,100.00
" 12	Frank Archer Ranch.....	587.6	"	37,900.00
" 13	Mountain Reservoir Site...	810	"	6,075.00
" 15	Harriman Lake Lands....	130	"	8,450.00

"	19	Sullivan Reservoir Site....	80	"	2,000.00
"	20A	Woodbury Land	20	" less	1,425.00
		right of way 1320' x 33'	1 A		
"	23	De Lappe Place.....	3½	lots	676.00
"	24	Part of Cottage Hill Tank Site	33	"	5,200.00
"	25	West Denver St. Deduct area of Lake Archer and Forebay	3	acres	14,500.00
"	26	Tail Race—Deduct.....	½	"	1,000.00
"	27	Lake Archer Canal and Mississippi St. Conduit, except filter area 13.31 acres and right of way 13527 x 50'—15.52 acres—net amount	104.80	"	163,292.00
"	30	Littleton Residence Lots...			3,250.00
"	32	Cottage Hill	46	lots	6,808.00
					296,756.00
Deduct for estimated right of way 33' from Nos. 9, 10, 11 and 12.....			30	acres	1,800.00
					294,956.00
Add 10% for Engineering, etc.....					29,495.60
					$324,451.60

1395 DEFENDANT'S EXHIBIT NO. 25.

Page 6.

Schedule B.

Deductions from Valuations of the Property of The Denver Union Water Company, as Given in Plaintiff's Exhibit C and Exhibit A-22.

Distribution System.

Difference between valuation of Distribution System by Messrs. Metcalf & Anderson, Plaintiff's Exhibit A-22, and Utilities Commission Engineers, not including Corporation Cocks	$452,752.00
Add Valuation for Corporation Cocks included in Plaintiff's Exhibit A-22, but not included by Utilities Commission Engineers	137,522.00
Duplicate pipe, obsolete, from valuation of Utilities Engineers	11,491.00
Total Difference	$601,765.00

DEFENDANT'S EXHIBIT NO. 25

Page 7, Item 5.

DIFFERENCE IN NET REPRODUCTION VALUE OF THE PHYSICAL PROPERTY OF THE DENVER UNION WATER COMPANY, EXCLUSIVE OF LANDS, BETWEEN THE VALUATION OF MESSRS. METCALF AND ANDERSON, FROM PLAINTIFF'S EXHIBIT A-22 AND EXHIBIT C, AND THE VALUATION OF THE UTILITIES COMMISSION ENGINEERS FROM DEFENDANT'S EXHIBIT NO. 19 SCHEDULE C.

Schedule	Valuation Metcalf & Anderson	Valuation Utilities Engineers	Item	Specific Valuation Deductions Metcalf & Anderson	Specific Valuation Deductions Utilities Engineers	Valuation Except Specific Deductions in Columns 5 & 6 Metcalf & Anderson	Valuation Except Specific Deductions in Columns 5 & 6 Utilities Engineers	Difference Plus	Difference Minus
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
C.	2,396,751.00	1,988,548.00	1	79,490.00	61,605.00	2,317,261.00	1,926,843.00		390,418.00
D.	93,286.00	102,673.00				93,286.00	102,673.00	9,387.	
E.	2,098,579.00	2,038,545.00				2,098,579.00	2,038,545.00		60,034.00
F.	319,378.00	415,866.00	2	77,079.00	95,000.00	242,299.00	320,866.00	78,567.	
G.	4,600,175.00	4,009,901.00				4,600,175.00	4,009,901.00		590,274.00
H.	335,519.00	365,657.00	3	7,576.00	5,212.00	327,943.00	360,445.00	32,502.	
I.	129,568.00	111,133.00				129,568.00	111,133.00		18,435.00
K.	230,369.00	100,129.00				230,369.00	100,129.00		130,240.00
Development Exp.	129,600.00	375,628.00				129,600.00	375,628.00	246,028.	
	10,333,225.00	9,508,080.00		164,145.00	161,817.00	10,169,080.00	9,346,163.00	366,484.	1,189,401.00
Differences	9,508,080.00			161,817.00		9,346,163.00			366,484.00
	825,145.00			2,328.00		822,917.00			822,917.00

Difference from Column 5		822,917.
Deduct Specific Deductions for Sullivan Reservoir	133,693.	
" " " " Corporation Cooks	137,522.	
" Difference on Schedule G	452,752.	723,967.
		98,950.
Deduct Difference between total valuation in Plaintiff's Exhibit C and Exhibit A-22, $25,060. and differences in Valuation of total Specific Deductions, Columns 3 and 4 above - - - $25,060. less $2,328. = $22,732.00 and Specific Deduction obsolete pipe, Utilities - Engineers' Valuation -- $22,732. plus $11,491. =		34,223.
Net Difference for Deduction, Item 5, Defendant's Exhibit No. 25, as remaining difference between valuation of Metcalf & Anderson and Utilities Engineers (except lands)		64,727.

Schedule	Description	Item	Valuation Metcalf & Anderson	Valuation Utility Engineers	Plus	Difference Minus
C.	Lake Archer & Canal	1	66,683.00	53,362.00		13,321.00
C.	Harriman Reservoir	1	12,807.00	8,243.00		4,564.00
F.	Platte Canon Pumps-Schedule A-1, page 3	2	31,610.00	25,000.00		6,610.00
F.	West Denver Pumps,-Schedule A-2, page 4	2	45,469.00	70,000.00	24,531.00	
H.	Littleton Residence	3	7,576.00	5,212.00		2,364.00
	Totals		164,135.00	161,817.00	24,531.00	26,859.00
	Net Differences		161,817.00			24,531.00
	Increase		2,328.00			2,328.00

Paving Over Mains.

In the valuation of the Engineers of the Public Utilities Commission, there was included for paving over mains, including engineering, contractors' profits, contingencies and interest during construction, less depreciation.....	$504,310.66

(Here follows tabular statement, marked page 1396.)

SCHEDULE D CONTINUED.

DIFFERENCES BETWEEN PLAINTIFF'S EXHIBIT C AND DEFENDANT'S EXHIBIT 19 IN LAND VALUATION ON LANDS LISTED FOR ELIMINATION IN RATE VALUATION, AS PER SCHEDULE A-3, WITH DEDUCTIONS FOR THE WATER RIGHT VALUES INCLUDED WITH THE LAND VALUATION IN DEFENDANT'S EXHIBIT NO. 19.

Item		Acres	Valuation Metcalf & Anderson	Valuation Utilities Engineers #	Difference Minus	Water Valuation Included by Utilities Engineers in Exhibit No. 19	Water Right Values as applied by Utilities Engineers Acres Irrigated	Rate per acre
	Schedule A							
9	Phebe Strong Ranch	680	18,080.00	12,420.00	5,660.00	7,560.00	126.00	60.00
10	William Strong Ranch(part) ##	240	15,000.00	13,299.00	1,701.00	8,700.00	145.00	60.00
11	Becky Archer Ranch	160	13,100.00	7,145.00	5,955.00	7,800.00	130.00	60.00
12	Frank Archer Ranch	587.6	37,900.00	33.290.00	4,610.00	19,200.00	320.00	60.00
13	Mountain Reservoir Site	810	6,075.00	4,300.00	1,775.00			
15	Harriman Lake Lands	130	8,450.00	1,750.00	6,700.00	7,050.00	130.00	25.00
19	Sullivan Reservoir Site	80	2,000.00	1,000.00	1,000.00			
20-A	Woodbury Land	19	1,425.00	475.00	950.00	475.00	19.00	25.00
23	DeLappe Place	3-1/5 lots	676.00	450.00	226.00			
24	Part of Cottage Hill Tank Site	33 "	5,200.00	1,584.00	3,616.00			
25	West Denver Station Land	3	14,500.00	3,000.00	11,500.00			
26	Tail Race	1/2	1,000.00	500.00	500.00			
27	Lake Archer Canal and Mississippi Street Conduit Land	104.60	163.292.00	104,600.00	58,692.00			
30	Littleton Residence Lots		3,250.00	2,800.00	450.00			
32	Cottage Hill Lots	46 lots	6,808.00	2,025.00	4,783.00			
			296,756.00	188,638.00	108,118.00	46,985.00		

\# NOTE: Valuation of Irrigated Lands by Utilities Engineers without water rights.

\## NOTE: Valuations are on remainder after deducting 40 acres for the Willard Filter Plant. 40 acres at $20.00 from Metcalf & Anderson Valuation and at $15.00 for Utilities Engineers' Valuation.

NOTE: Engineering and Contingencies in Valuations of Metcalf & Anderson not included, as no specific amount for this was applied by Engineers of Utilities Commission; the allowance for this being included under the general item of Development Expense.

1397 DEFENDANT'S EXHIBIT No. 25.

Page 8.

Schedule D.

Differences in Land Values as Shown in Plaintiff's Exhibit C, and Utilities Engineers' Valuation, with Deductions for Water Rights Where Included in the Latter Valuation.

Total Land Valuation as per Plaintiff's Exhibit C...		$920,103.00
Land Valuation of Engineers of Utilities Commission $513,601.00 less $93,312.00, Water Right Values included		420,289.00
Difference		499,814.00
Deduct:		
1. Water Valuation of Utilities Engineers on Specific Deductions	$46,985.00	
2. Specific Deductions as shown on Schedule A-3	324,451.00	371,436.00
		$128,378.00
Add:		
Difference between Metcalf & Anderson and Utilities Engineers' Valuations, less Water Rights, on Specific Deductions, Schedule A-3		108,118.00
Total net difference in Land Valuations for deduction		$236,496.00

(Here follows tabular statement, marked page 1398.)

Page No. —.

Approximate Differences in Valuation of the Physical Property of The Denver Union Water Company, Exclusive of Water Rights or Going Concern Value as Made by Messrs. Metcalf & Anderson (Plaintiff's Exhibit A-22) and the Engineers of the Public Utilities Commission of Denver, as of October 31, 1913.

Schedule.	Description.	Valuation. Metcalf & Anderson.	Valuation utilities engineers.	Differences. Increase.	Differences. Decrease.
A.	Lands outside of City	634,645.00	330,701.00	.....	303,944.00
B.	Lands inside the City	365,569.00	182,900.00	.....	182,669.00
C.	Structures	2,396,751.00	1,988,547.69	.....	408,203.31
D.	Infiltration Galleries	93,286.00	102,673.00	9,387.00	.....
E.	Conduits	2,098,579.00	2,038,545.00	.....	60,034.00
F.	Mechanical Equipment	319,378.00	415,866.00	96,488.00	.....
G.	Distribution System	4,600,175.00	4,009,901.00	.....	590,274.00
H.	Buildings, Etc.	335,519.00	365,657.00	30,138.00	.....
I.	Stock	129,568.00	111,133.00	.....	18,435.00
K.	Miscellaneous	230,369.00	100,129.00	.....	130,240.00
	Development Expense	129,600.00	375,628.00	246,028.00	.....
		11,333,439.00	10,021,680.69	382,041.	1,693,799.31
	Difference in Valuation as per Plaintiff's Ex. A-22, in excess of that of Utilities Engineers	1,311,758.31			

Deduction from Valuation of Metcalf & Anderson for difference in total Valuation between Valuation of Metcalf & Anderson in P't'ff's Exh. A-22 and P't'ff's Exh. C, page 64.....	25,060.00
Net difference in Valuation as per P't'ff's Exh. C, in excess of that of Utilities Engineers.....	1,286,698.31

NOTE.—Schedule G, Valuation of Metcalf & Anderson, includes $137,522.00 for corporation cocks not included by Utilities Engineers.

Schedule K, Valuation of Metcalf & Anderson, includes $133,693.00 for Sullivan Reservoir not included by Utilities Engineers.

If Valuation of Lands in Plaintiff's Exhibit C contains a duplication of Woodbury Tract, under Item 34, No. 15, Arapahoe Land, Valuation of Exhibit C, Schedule A, should be reduced by $1,500.00, and the above difference in the Valuations decreased by $1,500.00.

(Endorsed:) 6274. U. S. District Court, District of Colorado. Defendants' Exhibit #54. Filed Oct. 6, 1915. Charles W. Bishop, Clerk.

1400 DEF'T'S EX. NO. 72.

Horace H. Mitchell, Certified Public Accountant, Mining Exchange Building, Colorado Springs, Colorado, Telephone Main 710, P. O. Box 84.

February 27, 1915.

Hon. W. J. Chinn, Master, in suit The Denver Union Water Company vs. City and County of Denver.

DEAR SIR: In pursuance of your instructions handed me January 11, 1915, as therein specified, I beg to report that I have completed my examination and verification of Exhibits known as A 73 and A 74 submitted by The Denver Union Water Company, and as the result of such examination I submit herewith as part of this my report, and attached hereto.

Exhibit A—Earnings and Expenses, six months ended Oct. 31, 1913;
" B— " " " " " " Oct. 31, 1914;
" C— " " " year " Oct. 31, 1913;
" D— " " " " " Oct. 31, 1914;
" E—Legal Expenses in detail " " Oct. 31, 1913;
" F— " " " " " " Oct. 31, 1914;
" G—Rate Case " " " " Oct. 31, 1914;

the items in which are found in the Amounts as set forth in Exhibits A 73 & A 74.

I have carefully examined all vouchers and bills attached thereto and in many instances the checks supporting same, together with the pay-rolls; and to the best of my knowledge and belief I have found them correctly charged, in accordance with the evidence furnished and the information given me.

I have also carefully tested the receipts for water (about 175,000 Water Licenses in the two years) under the different designations as per Exhibits A 73 and A 74, and am fully satisfied that all receipts of these different departments for the respective periods have been accounted for and accurately set down in each of the aforesaid Exhibits, with the exception of Meter Rates for 1912-1913, where I find that deductions claimed and allowances made amounting to $9,366.06 for years prior to November, 1912, were charged against the Meter Rates for 1912-1913, thus reducing to that extent the Gross Earnings for that period, and with this exception just noted, noth-
1401 ing has been omitted from said statement of Gross Earnings, which should have been properly included therein, to the best of my knowledge and belief.

The method just noted has been regularly pursued by the Company, of charging against the year when allowances or rebates have been made, rather than against the year when original charges occurred. It does not affect the net results as shown by my Exhibit C; but is simply a question of method of handling such items, and which will always occur in a large going concern; but as these items

were of a noticeable amount, I deemed it best to handle them as per Exhibit C for your information.

As Water Licenses and Builders' Licenses are not entered until collected, which method (and which is correct) put them on a cash basis, such methods as just noted does not affect these two accounts.

I find an unappreciable difference of $392.48 in "Estimated Reduction in Gross Earnings based on Rates Prescribed by City, etc.," as shown in Exhibit "B,"—caused by an error in figuring only 20% reduction in the Emergency Rate to the Court House of $550.00 for six months, whereas, it should have been entirely eliminated, and a difference of $47.52 less in figuring 1914 instead of taking figures for 1913.

There were 44,280 Taps in 1913, with an average receipt of $25.68 plus per tap, while in 1914 there were 44,798 Taps with an average receipt of $24.59½; the difference per average tap is accounted for to a great extent in the large increase of delinquents in 1914 over those of 1913.

The "Extraordinary Expenses" deducted from "Operating Expenses" as per Exhibits B and D have been very carefully computed, especially those marked (*b*) and (*c*).

All Directors, including officers who are also Directors, when in attendance at Board Meetings, receive each $20.00 per attendance, which amounted in 1912-1913 to $4,600.00, and in 1913-1914 to $4,780.00.

I find paid to Mr. Geo. W. Shouland in 1912-1913 for "General Expenses" and "undesignated" items amounting to $357.40
1402 and in 1913-1914 "undesignated" $4,728.18; and by Mr. W. P. Robinson in 1912-1913 for "Special" $150.00, and in 1913-1914 for "petty" and "undesignated" $1,147.05; all of foregoing were approved on the vouchers by the proper officers.

I have therefore not deemed it necessary to deduct these items from the different accounts, which were chiefly charged to General Expense.

In conclusion I would state that I have not experienced or noticed the slightest inclination or disposition on the part of any one connected with the Company to conceal anything appertaining to the accounts in question. I wish here to record my appreciation of the universal courtesy extended to me and the assistance rendered in the way of information when requested, by all the officers and employes while making the examination and verification.

Salaries of Executive Officers per annum $60,100.00.

Respectfully submitted,

HORACE H. MITCHELL,
Certified Public Accountant.

1403 EXHIBIT "A."

The Denver Union Water Company.

Statement of Net Earnings for the Six Months Ended October 31, 1913, Based on Leaflet Rates in Effect During Such Period.

Gross Earnings.

		Based on leaflet rates in effect during the period. (Actual.)
Water:		
Water Licenses	(a)	$696,140.95
Builders' Licenses		7,037.21
Meter Rates		75,274.18
Hydrant Rentals		40,445.93
Total Water		$818,898.27
Rentals, Ranch Income, etc.		17,630.10
Total Gross Earnings		$836,528.37

Operating Expenses and Taxes.

Operating Expenses:	
Pumping Works	$37,055.42
Reservoirs	17,559.94
Conduits	11,327.67
Filtration	20,371.08
Laboratory	1,282.65
Sanitary Inspection	1,383.49
Street Repairs	1,342.47
Hydrant Repairs	3,651.42
New Taps	225.78
Service Repairs	6,046.95
Meter Service	512.82
Office Expenses	32,749.05
Stable Expenses	2,670.97
Automobile Expenses	4,754.51
Stable and Auto Service	7,656.40
Ranch Expense	6,810.60
Legal Expense	31,862.86
Rate Case Expense	.....
General Expense	8,767.80
Insurance	3,156.60
Loss and Damage	58.38

Rentals	5,725.68
Total Operating Expenses	$188,182.54
Net Operating Expenses	188,182.54
Taxes	60,563.83
Total Operating Expenses and Taxes	$248,746.37
Net Earnings Without Deduction for Depreciation or Contingencies	$587,782.00

NOTE.—(*a*) At October 31, 1913, the delinquent water license payments appeared in amount approximately $6,152.55

EXHIBIT B.

The Denver Union Water Company.

72—736

Statement of Net Earnings for the Six Months Ended October 31, 1914, Based on Leaflet Rates in Effect During Such Period, and for the Six Months Ended October 31, 1914, Based on Rates Prescribed by City Ordinance Effective May 1, 1914.

	Based on rates prescribed by city ordinance, effective May 1, 1914.	Estimated reduction in gross earnings, based on rates prescribed by city ordinance, effective May 1, 1914.	Based on leaflet rates in effect during the period. (Actual.)
Water:	Gross Earnings.		
Water Licenses	$535,630.25	$139,948.29	(a)$675,578.54
Builders' Licenses	2,415.39	862.32	3,277.71
Meter Rates	61,980.07	12,931.38	74,911.45
Hydrant Rates	32,454.36	8,113.59	40,567.95
Total Water	$632,480.07	$161,855.58	$794,335.65
Rentals, Ranch Income, etc.	12,442.01	.....	12,442.01
Total Gross Earnings	$644,922.08	$161,855.58	$806,777.66
	Operating Expenses and Taxes.		
Operating Expenses:			
Pumping Works	$40,147.29	.....	$40,147.29
Reservoirs (b)	35,713.53	.....	(b) 35,713.53
Conduits (c)	18,078.32	.....	(c) 18,078.32

Filtration		28,152.76	.....		28,152.76
Laboratory		1,393.05	.....		1,393.05
Sanitary Inspection		1,372.86	.....		1,372.86
Street Repairs		4,092.27	.....		4,092.27
Hydrant Repairs		3,210.59	.....		3,210.59
New Taps		1,448.02	.....		1,448.02
Service Repairs		5,865.50	.....		5,865.40
Meter Service		730.30	.....		730.30
Office Expenses		36,490.85	.....		36,490.85
Stable Expenses		2,486.32	.....		2,486.32
Automobile Expenses		5,490.48	.....		5,490.48
Stable and Auto Service		7,777.75	.....		7,777.75
Ranch Expense		6,499.07	.....		6,499.07
Legal Expense		16,419.36	.....		16,419.36
Rate Case Expense	(*d*)	71,925.52	.....	(*d*)	71,925.52
General Expense		5,889.66	.....		5,889.66
Insurance		3,285.08	.....		3,285.08
Loss and Damage	(*e*)	236.55	.....	(*e*)	236.55
Personal Injuries		50.00	.....		50.00
Rentals		5,408.10	.....		5,408.10
Total Operating Expenses		$285,147.03	.....		$285,147.03

1405

Less Extraordinary Expenses included in above which would be chargeable to a Depreciation and Contingent Reserve Fund:					
Replacement of Roof on West Basin of Ashland Avenue Reservoir (included in "Reservoirs")	(*b*)	$23,177.46	.....	(*b*)	$23,177.46

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Repairing damage to Conduit caused by flood condition of South Platte River (included in "Conduits")	(c)	3,798.18	.....	(c) 3,798.18
Rate Case Expenses	(d)	71,925.52	.....	71,925.52
Removal of wreckage of reservoir roofs caused by snow storm in Dec. 1913 and damages due to flood (included in "Loss and Damage")	(e)	111.55	.....	111.55
Total Extraordinary Expenses		$99,012.71	.....	$99,012.71
Net Operating Expenses		$186,134.32	.....	$186,134.32
Taxes		60,089.87	.....	60,089.87
Total Operating Expenses and Taxes		$246,224.19	.....	$246,224.19
Net Earnings Without Deduction for Depreciation or Contingencies		$398,697.89	$161,855.58	$560,553.47
Deduction for Depreciation and Contingencies Reserve Fund		85,000.00		
Net Earnings After Deducting Provision for Depreciation and Contingencies		$313,697.89		

NOTE.—(a) At October 31, 1914, the delinquent water license payments appeared in amount approximately $37,619.70

1406 EXHIBIT C.

The Denver Water Company.

Statement of Net Earnings for Year Ended October 31, 1913.

Gross Earnings.

Water:			
Water Licenses	(a)	$1,137,146.85	
Builders' Licenses		14,167.63	
Meter Rates		132,157.91	
Hydrant Rentals		80,136.00	
Total Rates		$1,363,608.39	
Rentals, Ranch Income, etc.		19,095.57	
			$1,382,703.96

Operating Expenses and Taxes.

Operating Expenses:		
Pumping Works	$62,006.18	
Reservoirs	25,814.14	
Conduits	19,167.39	
Filtration	36,487.74	
Laboratory	2,649.70	
Sanitary Inspection	2,363.05	
Street Repairs	5,293.61	
Hydrant Repairs	8,252.92	
New Taps	407.18	
Service Repairs	8,726.91	
Meter Service	2,057.80	
Office Expenses	80,807.56	
Stable Expenses	5,714.36	
Automobile Expenses	8,728.05	
Stable & Auto Service	15,039.20	
Ranch Expenses	10,975.61	
Legal Expenses	45,716.76	
Rate Case Expenses	.....	
General Expenses	22,480.60	
Insurance	8,496.79	
Loss and Damage	1,047.97	
Rentals	10,901.66	
Net Operating Expenses	$352,242.42	
Taxes	117,146.62	
		$469,389.04
		$913,314.92
Rebates and claims allowed of 1911 and 1912		9,366.06
Net Earnings Without Deduction or Depreciation or Contingencies		$903,948.86

NOTE.—(a) At October 31, 1913, the delinquent water licenses appeared in amount, approximately **$6,152.55**

EXHIBIT D.

The Denver Union Water Company.

Statement of Net Earnings for Year Ended October 31, 1914.

Gross Earnings.

Water:			
Water Licenses	(a)	$1,101,818.64	
Builders' Licenses		5,438.77	
Meter Rates		135,371.92	
Hydrant Rentals		80,737.32	
Total Water		$1,323,368.65	
Rentals, Ranch Income, etc.		12,269.44	
Total gross earnings			$1,335,636.09

Operating Expenses & Taxes.

Operating Expenses:			
Pumping Works		$68,702.67	
Reservoirs	(b)	42,700.46	
Conduits	(c)	26,328.73	
Filtration		47,394.86	
Laboratory		2,588.66	
Sanitary Inspection		2,334.49	
Street Repairs		8,344.52	
Hydrant Repairs		7,567.36	
New Taps		2,245.85	

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Service Repairs		10,632.89	
Meter Service		3,153.54	
Office Expenses		81,934.17	
Stable Expenses		5,055.07	
Automobile Expenses		11,457.02	
Stable & Auto Service		16,067.25	
Ranch Expenses		10,680.78	
Legal Expenses		31,597.86	
Rate Case Expenses	(d)	72,360.97	
General Expenses		19,932.93	
Insurance		8,565.41	
Loss and Damage	(c)	14,750.07	
Personal Injuries		50.00	
Rentals		10,695.93	
Total Operating Expenses			$473,276.99

1408

Less Extraordinary Expenses included in above which would be chargeable to a Depreciation and Contingent Reserve Fund:			
Replacement of roof on West Basin of Ashland Ave. Reservoir (included in "Reservoirs")	(b)	$23,706.93	
Repairing damage to Conduit caused by flood condition of So. Platte River included in "Conduits"	(c)	3,798.18	
Rate Case Expenses	(d)	72,630.97	

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Removal of snow and wreckage of reservoir roofs, caused by snow storm in Dec. 1913 and damages due to flood (included in "Loss & Damage") .... (e)	14,615.07		
Total Extraordinary Expenses		$114,751.15	
Net Operating Expenses		$358,525.84	
Taxes		118,669.33	
Total operating expenses and taxes			$477,195.17
Net Earnings Without Deduction for Depreciation or Contingencies			$858,440.92

NOTE.—(a) At October 31, 1914, the delinquent licenses appeared in amount, approximately.. 37,619.70

1409

EXHIBIT E.

The Denver Union Water Company.

Legal Expense.

1913.

Gerald Hughes	$12,500.00	
W. P. Miller, Secretary	4,000.00	
Vaile, McAllister & Vaile	15,000.00	N. Y. Trust Co. vs. Denver.
Hughes & Dorsey	7,500.00	
Van Vorst, Marshall & Smith	3,759.25	
	$42,759.25	

Norman Grey—Verner suit		500.00	
Hughes & Dorsey, Expenses N. Y. & Washington		825.00	
W. P. Miller, N. Y. a/c Verner		411.15	
N. Y. Trust Co. " "		585.21	
Jno. M. Enricht		1,000.00	
W. P. Robinson, Expenses N. Y.		319.75	a/c Bondholders.
Smith-Brooks Printing Co., 100 pfs		640.79	N. Y. Trust Co. vs. Denver.
W. P. Miller, N. Y. a/c Verner		364.75	
Hughes & Dorsey, Traveling expenses		420.45	
W. P. Miller to N. Y.		265.00	
Edwin H. Park, services		1,000.00	at Washington.
C. W. Bishop, Clerk		2,822.20	N. Y. Trust Co. vs. Denver.
A. F. Willmarth, Clerk		533.35	Water right suits.
		$52,446.90	
Sundries		1,600.33	
		$54,047.23	
Less Sundry Credits	$472.10		
Proportion to Construction and Reserve a/c.	7,858.37		
		$8,330.47	
Total		$45,716.76	

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1410 EXHIBIT F.

The Denver Union Water Company.

Legal Expense.

1914.

Gerald Hughes		$12,500.00
W. P. Miller, Secretary		4,000.00
Norman Grey		948.50
McDermott, Wright, et al		1,558.57
C. C. Dawson		1,000.00
Hayt, Dawson, et al		300.00
C. W. Turnbull		800.00
H. A. Lindsley		2,035.46
Edward H. Park		2,621.50
Pershing & Titsworth		175.00
Hughes & Dorsey		8,000.00
		$33,939.03
Bond Premiums		847.50
J. B. Pearce, Secretary, Renewal of Charter		1,515.00
		$36,301.53
Sundries		1,190.86
		$37,492.39
Less Sundries	$95.60	
Proportion to Construction a/c	5,798.93	
		5,894.53
Total		$31,597.86

1411 EXHIBIT G.

The Denver Union Water Company.

Rate Case.

1914.

M. L. Holman	$3,317.00
Jno. R. Freeman	6,458.00
G. G. Anderson	4,200.00
Metcalfe & Eddy	9,171.70
A. D. Wall	2,607.50
Chas. W. Comstock	2,850.00
Hazen & Whipple	1,900.00

A. A. Willard	806.80
H. A. Lindsley	921.52
Hughes & Dorsey	15,235.85
Clarence Goldsmith	804.20
Services of sundry persons	275.30
Heineman	5,236.20
Hotels for Engineers, etc	883.60
Haskins & Sells	4,454.97
Pay-Roll	5,515.45
Mdse. Supplies	510.67
Expenses of W. P. Robinson, W. R. Miller and G. W. Shouland on sundry trips	705.45
Undesignated by W. P. Robinson	646.70
Automobile Expenses	966.25
Sundry Expenses	4,413.01
Master's Allowance, deposited with Clerk of the Court	1,000.00
	$42,880.97
Refund by G. W. Shouland	250.00
Total	$72,630.97

(Endorsed:) 6274. U. S. District Court, district of Colorado. Defendants' Exhibit *Exhibit* 72. Filed Oct. 6, 1915. Charles W. Bishop, Clerk.

1412 UNITED STATES OF AMERICA,
District of Colorado, ss:

In the District Court of the United States for the District of Colorado.

No. 6274.

THE DENVER UNION WATER COMPANY, a Corporation, Plaintiff,
vs.
THE CITY AND COUNTY OF DENVER et al.

Proceedings February 1, 1916.

Mr. Dorsey: There are one or two matters to be taken up before the presentation of the final decree—merely formal matters, your Honor. On Saturday we received from the clerk a certified copy of the order which had been entered in this case, No. 6274, on the previous day, and on reading it I found that the order as entered contained this recital:

The Court (interrupting): I prepared that decree myself—that order. What do you object to in the order?

Mr. Dorsey: I think that it misrepresents what I said, or, at any rate, it misrepresents what I intended to say, and I fear as it is now framed it constitutes a waiver on my part of any exceptions we might have been at liberty otherwise to present.

The Court: I took it as a waiver both by you and Mr. Nye.
1413 I think Mr. Nye stood on the legal questions that he said were open for consideration.

Mr. Dorsey: I think Mr. Nye and myself were in exact agreement. Let me read what it says.

The Court: I remember what it says.

Mr. Dorsey: Your Honor will remember, when your recollection is refreshed, what I did was to call to your Honor's attention certain authorities, and without reading them, stated that in my judgment the effect of those authorities was that no question was open, under such consent of reference as this, except a pure question of law.

The Court: I don't remember your putting that qualification in, Mr. Dorsey; but even if you did it would have gone the same way, except the order might have said that you and Mr. Nye were of the same opinion. I don't think there is anything in it to bother about trying to change it to just what you think you said.

Mr. Dorsey: The only point is this, that it might be prejudicial in case of a review at any time. With this decree, of course, so far as we are concerned, nothing can be reviewed, as I understand, except those things to which we have excepted. If in the lower court we came in and waived all of our exceptions, it is quite possible that the Appellate court——

The Court (interrupting): Do you think it is conceivable
1414 that the Appellate Court would hear the other side on questions of law on the idea under the order of appointing the master that those questions were not foreclosed, but would not hear you on questions of law? I do not think it is possible any court would ever take any such position because you hadn't said, according to the order, that the questions of law were still open for discussion, that nevertheless the Appellate Court would hear Mr. Nye and Mr. Marsh on the questions of law, but say you were foreclosed to respond to those questions that they raised, or raised any other question of law. I cannot change that order now.

Mr. Dorsey: I would like the record to show I move that the order be amended to set forth in respect to my representation that it was to the effect that in my judgment the consent order appointing the master in chancery foreclosed the inquiry as to any finding of fact which the master in chancery had made but not as to questions of law.

The Court: I should not have hesitated to put it that way at the time if you had asked to have it put that way, but I will not change it, first, because I do not remember that you made such an announcement, and, second, because I think it is wholly immaterial to your rights.

Mr. Dorsey: All right, your Honor.

The Court: Now, what else?

Mr. Dorsey: Before entering the final decree it becomes necessary to make certain substitution of parties—defendant officials
1415 of the city—whose terms have expired and whose successors have been elected. The stipulation has been signed that that may be done, and I have prepared a written order pursuant to that

stipulation (handing paper to court).

The Court: Yes.

Mr. Dorsey: We have also prepared a draft of a decree which follows your Honor's judgment as we understood it to be. This was served on counsel on the other side on last Saturday. What, if any, objection to that form they have, I don't know exactly, but I think they have some exceptions to make.

Mr. Marsh: Your Honor announced on the argument on the exceptions that you would leave the question of water rights and going-concern to be determined by the Appellate Court. We very much fear in the present situation of the record we will be foreclosed from raising those questions. I want to call your Honor's attention just briefly to an authority on that point. I wasn't in the case at the time the special master was appointed. When I speak about it I only speak with such information as I obtained from other counsel; but my information which I have obtained is that the special master was appointed by an order of court, and that the person agreed upon was satisfactory to counsel on both sides. In other words, that while counsel agreed to the person who was appointed, that the reference was not by agreement but by order of the court. The record
1416 in the case, as I find it, seems to show that the reference was made by consent of both parties.

The Court: We will not change that order. There is a written order appointing the master: it was submitted to counsel, and everybody who appeared in the case agreed to that order. Whatever that order says will stand. I was firmly of the opinion that that order of appointment reserved to each party the right to except. I thought so until Mr. Dorsey made the suggestion he did at the last hearing, and I reached over and got this order that lay here with the papers. I hadn't read it since the appointment, and I discovered that counsel did ask to have put in that order a reservation of the right to object to testimony and I interlined that with a pen. I evidently got the idea what I had interlined was a reservation of the right to except.

Mr. Marsh: I don't understand it so appears now, a reservation of the right to except.

The Court: No; there is no reservation of the right to except.

Mr. Marsh: Unless that should appear as to the exceptions and that they are properly overruled, we will not be in position to raise them in the Appellate Court.

The Court: I don't think you can.

Mr. Marsh: That is the reason I failed to agree to the statement that the report of the special master is conclusive upon this
1417 court, because I did not understand that the agreement was by common consent, but it was upon an order of the court. If that is the view your honor takes of it and the reference order should not be modified in that respect, then I would like to have the exceptions passed, filed with the special master and overruled by him in order that we will be able to raise the question in the upper court.

The Court: I notice one phrase here (reading): "That the report

of the special master be, and the same hereby is, in all particulars, approved and confirmed, all exceptions thereto of each of the parties to this cause having heretofore been overruled." I have changed that word "overruled" to "stricken" reconsidering the matter in making that order last Friday, because I felt that provision might indicate that the court had considered the exceptions.

Mr. Marsh: In order that we may not be foreclosed from raising the question in the upper court, in view of your Honor's ruling, I ask to be permitted to file these exceptions with the special master for his approval before final decree is entered. I also desire to state in connection with that order that was entered, to which Mr. Dorsey called attention, that it was my idea and I intended to convey my impression to your Honor that I thought your Honor did have power to pass upon the exceptions as filed where the facts were not
1418 disputed and the facts clearly appeared on the face of them as being contrary to the finding which the special master made. I would like to have the record show that I think the court could pass upon the questions where the facts are not disputed, showing upon their face that they are contrary to the law.

The Court: I will treat your position as I have Mr. Dorsey's on that proposition.

Mr. Marsh: We would like to raise this question in the Appellate Court.

The Court: Yes; I don't suppose anybody connected with this case has any idea that there will ever come a time when this litigation will be finally at an end in this controversy. I haven't any notion of that sort, nor counsel have any idea about this case that there ever will be a time that it will not be in court for something.

Mr. Marsh: We have prepared another decree, which we would like to submit for your Honor's consideration.

The Court: All right, let's see it.

Mr. Marsh: The only change in paragraph 2 we have is wherein the ordinance is invalid, and the correction is as follows: That the ordinance is invalid "in that said ordinance attempts to and does deprive the complainant of its property without due process of law, and takes the private property of said complainant for public use without just compensation, in violation of Amendment V of
1419 the Constitution of the United States, and in that it abridges the privileges and immunities of the complainant and deprives the complainant of its property without due process of law, and denies to the complainant the equal protection of the law, in violation of the XIV Amendment to the Constitution of the United States." In other words, we think the decree should show that it is based upon a violation of the Constitution of the United States.

The Court: That is for the purpose of appeal direct to the Supreme Court?

Mr. Marsh: For the purpose of appeal direct to the Supreme Court. The matter of costs we would also like to be heard on briefly. I see the decree as submitted by Mr. Dorsey provides that all costs shall be taxed against the defendants. My idea is in an equity suit of this kind—and the rule so provides—that your honor may apportion the

costs; and I think your Honor suggested upon the allowance of the fees to the master, that the other side was interested in bearing some part of the costs.

The Court: I said we would take care of that later.

Mr. Marsh: This is, in my judgment, a proper case where the costs, or some portion thereof, should be borne by the complainant.

The Court: I don't think so. I see nothing in the record, and the master does not call my attention to anything in the record, showing that the council made any investigation at all; it passed that
1420 ordinance—just simply reached up and got it out of the air, regardless of what its effects might be—no inquiries—no ascertainment of the true facts, or know anything about—just passed it. I think when it did it, it entered upon a course that it ought to pay the expense for that ordinance declared to be void.

Mr. Marsh: The ordinance was initiated under the power conferred by the charter, and the municipality in initiating the ordinance was exercising a governmental function.

The Court: The people who initiated the ordinance, I take it, represented the whole city under the law. It seems that the law vests a certain number of petitioners with authority to represent the public, and if the public wants to submit its affairs in that sort of way, and who, by force under the statute under the initiative process, compel the officers to act, we shall have to leave the public to pay for it.

I have no objection to putting into your paragraph 2 a part of what you insert, towit: "That said ordinance attempts to and does deprive the complainant of its property without due process of law, and takes the private property of said complainant for public use without just compensation." I concur with that being the effect of that ordinance—necessarily so. I think you may write that into your form, Mr. Dorsey.

Mr. Dorsey: Just down to and including the word "compensation"?

1421 The Court: Yes. It gives the benefit of the same point that they desire.

Mr. Dorsey: I have no objection. I didn't put it in because I thought it was unnecessary, under the decisions.

The Court: I think so too, but if Mr. Marsh wants it we will let him have it. I think you can interline it without much trouble.

Mr. Marsh: I would like the record to show that I made an application to have the exceptions referred to the special master, and that it was denied, for his ruling.

The Court: I don't see how we can make the record show that, Mr. Marsh. You better put that in the form of a motion.

Mr. Marsh: A written motion?

The Court: Yes, I think we may preserve it better that way. We cannot enter it on the record proper.

Mr. Marsh: I will ask leave to prepare it and file it as of this time.

The Court: All right, we will let you get it in.

Mr. Marsh: Then I ask that the record show we presented a form of decree and your Honor declined to sign the form as presented.

The Court: All right. Attach that to that motion, if you can conveniently.

Mr. Dorsey: Will your Honor be sitting this afternoon?

1422 The Court: Yes: I will sign it any time you bring it in.

Mr. Marsh: The decree will be signed as of this time. I ask on behalf of all of the defendants that your Honor allow the appeal to the Supreme Court of the United States and fix the amount of the bond.

The Court: The bond will be very small. I think a $500 bond will do.

Mr. Marsh: Let the record show that the appeal has been allowed.

The Court: That can be granted at any time within six months.

Mr. Marsh: We make the application now orally to save the necessity of filing the petition.

The Court: Very well. We will let the record show, when we signed and entered the decree that appeal was prayed for and appeal granted, bond fixed at $500. Not a supersedeas bond. There is nothing to supersede anyway.

Mr. Marsh: Is it your Honor's understanding that the costs are not payable until the appeal is determined.

The Court: No; the costs are payable now.

Mr. Marsh: We will have to have some reasonable time to provide for the costs.

1423 The Court: I don't suppose Mr. Dorsey will want any process.

I, William W. Heinemann, do certify that I reported the foregoing proceedings, and that the same is a true transcript of the same as taken by me.

WILLIAM W. HEINEMANN.

(Endorsed:) 6274. U. S. District Court, District of Colorado. The Denver Union Water Company vs. City and County of Denver et al. Transcript of Proceedings of February 1, 1916. Filed Jul-29, 1916. Charles W. Bishop, Clerk.

1424 UNITED STATES OF AMERICA,
District of Colorado, ss:

In the District Court of the United States for the District of Colorado.

No. 6274. In Equity.

THE DENVER UNION WATER COMPANY, a Corporation, Complainant,

vs.

CITY AND COUNTY OF DENVER; ROBERT W. SPEER, as Mayor of the City and County of Denver; W. F. R. Mills, as Manager of Improvements and Parks of the City and County of Denver; Clair J. Pitcher, as Manager of Revenue of the City and County of Denver *of the City and County of Denver;* William H. Sharpley, as

Manager of Health and Charity of the City and County of Denver; Dewey C. Bailey, as Manager of Safety and Excise of the City and County of Denver; James F. Markey, as Auditor of the City and County of Denver; Charles A. Lammers, as Clerk and Recorder of the City and County of Denver; Louis F. Bartels, J. A. Burnett, John Conlon, W. C. Danks, D. J. Monaghan, J. B. Rycraft, Thomas O. Spacy, Jesse M. Wheelock, and Harry Zimmerhackel, as Members of and Constituting the Council of the City and County of Denver, and Armour C. Anderson, as Sole Member of and Constituting the Public Utilities Commission of the City and County of Denver, Defendants.

1425 *Stipulation.*

It is hereby stipulated by and between the parties to the above entitled cause, through their respective solicitors, that the foregoing statement of evidence, together with the transcript of the stenographer's notes of proceedings had in said cause February 1st, 1916, together with the addition of exhibits hereinafter listed (originals or copies whereof are to be included therein), may be approved by the court or judge as the statement of the evidence to be used for the purposes of defendants' appeal and the cross appeal of the plaintiff to the Supreme Court of the United States, under Equity Rule 75; and the plaintiff hereby waives its right to have said statement of the evidence first lodged in the Clerk's office for its examination, and further waives its right to ten days' notice of the time and place when and where the defendants will ask the court or judge to approve the same as provided in and by said Rule 75.

The following comprise the exhibits above referred to:

Plaintiff's exhibits C, E, Q, S, Z, ZZ, A-1, A-2, A-3, A-4, A-7, A-8, A-9, A-19, A-26, A-27, A-28, A-31, A-34, A-35, A-36, A-37, A-56, A-61, A-75, A-80, A-88, A-92, A-96, A-97, A-98, A-99, A-100, A-101, A-102, A-103, A-104, A-105, A-106, A-107, A-108.

Defendants' exhibits 47, 54 and 72.

GERALD HUGHES,
1426 C. C. DORSEY,
Solicitors for Complainant.

JAMES A. MARSH,
F. W. SANBORN,
Solicitors for Defendants.

The foregoing statement of the evidence and transcript of court proceedings to be included in the record on appeal and cross appeal (including the exhibits listed in the foregoing stipulation,) being now presented in due time and found to be true, complete and properly prepared, I do hereby approve the same.

And it is hereby ordered that the said exhibits in either their original form, or copies thereof, may be included in the said record on appeal and cross appeal.

Dated this 14th day of August, A. D. 1916.

ROBT. E. LEWIS,
United States District Judge.

(Endorsed:) No. 6274. United States District Court. The Denver Union Water Co., Complainant, vs. City and County of Denver, et al., Defendants. Stipulation in re Statement of the Evidence and Certificate of Approval. Filed Aug. 14, 1916. Charles W. Bishop, Clerk.

1427 Sixty-eighth Day, May Term, Thursday, October 7th, A. D. 1915.

Present: The Honorable Robert E. Lewis, district judge, and other officers as noted on the fourth day of May, A. D. 1915.

In Equity.

6274.

THE DENVER UNION WATER COMPANY

vs.

THE CITY AND COUNTY OF DENVER et al.

Bill for Injunction and for Other Relief.

This cause comes on now to be heard. And thereupon, on consideration thereof,

It is ordered by the court that all parties hereto may file herein exceptions to the report of William J. Chinn, Special Master, within thirty (30) days from this day, as they shall be advised.

1428 In the District Court of the United States for the District of Colorado.

In Equity. No. 6274.

THE DENVER UNION WATER COMPANY, a Corporation, Plaintiff,

vs.

THE CITY AND COUNTY OF DENVER et al., Defendants.

Plaintiff's Exceptions to Report of Special Master.

In so far as, under the order of reference in this case, the report of the Special Master is in law conclusive as to any matters therein contained, the plaintiff does not consent to the review of such matters by the Court, but files these exceptions, subject to such rulings as the court may make as to its right and duty to review such matters, to be urged with respect only to such findings and conclusions as the court may find are so subject to review, and without waiver or prejudice of any and all of plaintiff's rights in the premises.

With the foregoing reservation, plaintiff excepts to certain portions of the report of the Special Master filed herein, in the following particulars and for the following reasons, towit:

I.

Because the Special Master is in error in finding that "The evidence shows no material change in the plant between this day and the time when the evidence was heard," (his report, paragraph 11), because in truth and fact, large additions of valuable property were made to the plaintiff's plant, of a value in excess of three
1429 hundred and fifty thousand dollars ($350,000.00), subsequent to the first day of May, 1914, and prior to the date on which the taking of testimony herein was closed, evidence of the value of which added property was offered on behalf of the plaintiff and excluded by the Master (plaintiff's abstract, rebuttal testimony, page 893, plaintiff's testimony, page 3806), and the Master should have limited his said finding to the property of the plaintiff, owned by it and constituting its plant on the first day of May, 1914, as was in other portions of the report so limited.

II.

Because the Master erred in finding the reasonable value of all the property used by the plaintiff on May 1st, 1914, as a part of its water plant for the delivery of water to the city and its inhabitants to be thirteen million, four hundred fifteen thousand, eight hundred ninety-nine dollars ($13,415,899.) as set forth in the twelfth paragraph of his report and table one thereof, and in paragraph forty-eight of his report, whereas all the evidence in the case shows that the fair and reasonable value of the property used by the plaintiff for the convenience of the public was on May 1st, 1914, in excess of fifteen million, three hundred thousand dollars (*$15,300.00*). That said errors in arriving at said total value are due to certain errors in law and fact with respect to certain items of the certain classes set forth in table one in said paragraph twelve, to which items, specific exceptions are hereinafter directed and taken.

1430 III.

Because the Special Master allowed for the Lake Cheesman Lands (Exhibit C, class A, Item 1) only the sum of one hundred sixty thousand dollars ($160,000), (his report paragraph 14), whereas the evidence shows without substantial dispute that said allowance should have been at least the sum of two hundred thousand dollars ($200,000.00) (plaintiff's abstract, pages 65, 81, 92, 101, 106, 139, 140, 159, 164, 181, 184, 189).

IV.

Because the Master allowed for the Platte River Stone Placer Mining Claim (Exhibit C, class A, item 2) only the sum of seven hundred sixty-five dollars ($765.00), (his report, paragraph 14), whereas the evidence shows without substantial dispute that said allowance

should have been at least the sum of thirty-six hundred dollars ($3,600.00), (Exhibit A-7, Exhibit A-75, plaintiff's abstract, page 146

V.

Because the Master allowed for the Platte Canon Valley lands (Exhibit C, class A, item 3) only the sum of three thousand, sixty-five dollars ($3,065.00), (his report, paragraph 14), whereas the evidence shows without substantial dispute that said allowance should have been at least seventy-five hundred dollars ($7,500.00), (Exhibit A-7, Exhibit A-75, plaintiff's abstract, page 164).

VI.

Because the Master allowed for the Platte Canon filter site
1431 (Exhibit C, class A, item 5) only the sum of one thousand dollars ($1,000.00), (his report paragraph 14), whereas the evidence shows without substantial dispute that said allowance should have been at least the sum of fifty-three hundred and fifty dollars ($5,350.00) (Exhibit A 7, Exhibit A 75, plaintiff's abstract page 164).

VII.

Because the Master allowed for the Platte Canon power house site (Exhibit C, class A, item 6), only the sum of one thousand dollars ($1,000.00) (his report, paragraph 14), whereas the evidence shows without substantial dispute that said allowance should have been at least two thousand dollars ($2,000.00), (Exhibit A 7, Exhibit A 75, plaintiff's abstract page 164).

VIII.

Because the Master allowed for the Marston Lake reservoir site (Exhibit C, class A, item 17) only the sum of one hundred and twenty-five thousand dollars ($125,000.00) (his report, paragraph 14), whereas the evidence shows without substantial dispute that said allowance should have been at least the sum of one hundred sixty-eight thousand dollars ($168,000.00) (Exhibit A 75, plaintiff's abstract pages 42, 45, 118, 119, Exhibit A 7, plaintiff's abstract pages 65, 30, 82, 88, 101, 104, 139, 140, 164).

IX.

Because the Master allowed for the Cherry Creek galleries site
(Exhibit C, class A, item 20) only the sum of four thousand,
1432 three hundred and seventy dollars ($4370.00) (his report, paragraph 14), whereas the evidence in this case shows without substantial dispute that said allowance should have been at least the sum of eighty-five hundred dollars ($8500.00) (Exhibit A 75, plaintiff's abstract, page 164).

X.

Because the Master erred, as a matter of law, in refusing to consider, in determining the present fair value of the lands, anything on account of the actual or estimated consequential or severance damages (his report, paragraph 15).

XI.

Because the Master erred in refusing to consider, in connection with the determination of the present fair value of the lands, or to include therein, anything whatever on account of overhead expenses, (his report, paragraph 15), which the evidence in this cause shows without substantial dispute would require an addition of at least ten per cent (10%) to the actual market value of the lands for ordinary purposes, amounting to an approximate sum from fifty thousand dollars ($50,000.00) to seventy-five thousand dollars ($75,000.00) (Exhibit C, class A, page 115; plaintiff's abstract, page 159; plaintiff's proof, volume IV, page 1821; plaintiff's abstract, page 327; defendant's proof, volume II, pages 628-631).

XII.

Because the Master erred in ignoring and refusing to allow
1433 any value on account of the special availability and adaptability for certain uses of Lake Cheesman and Lake Marston lands and of the specific tracts of land mentioned in paragraph 17 of his report, and hereinabove particularly referred to.)

XIII.

Because the Master erred in allowing for the Lake Cheesman lands (his report, paragraph 18) only the purchase price paid therefor by the Water Company in the year 1899 (plaintiff's abstract, page 45), overlooking the fact that, as the evidence shows without substantial dispute, the value of reservoir lands has greatly increased since said date, and also overlooking the fact, that as shown by the evidence, the Company was obliged to hold said lands for many years and incur great additional cost on that account, before it could complete the reservoir and make the same an operating unit in its plant (plaintiff's proof, vol. II, pages 444-445; vol. III, pages 1399-1400; vol. IV, pages 1492 and 1535-1536.)

XIV.

Because the Master erred in refusing to include in his valuation of the Marston Lake reservoir lands (Exhibit C, class A, item 17) anything whatever on account of their peculiar availability and adaptability (his report, paragraph 19), although the evidence shows without substantial dispute that for said reason they possess

a value largely in excess of their market value for ordinary purposes,
which alone the Master allowed (plaintiff's abstract, pages
1434 30, 65, 82, 88, 101, 104, 139, 140, 164), and therefore said
item I of Class A should have been valued by the Master in the sum of *at* one hundred and sixty-eight thousand dollars ($168,000.00).

XV.

Because the Master erred in excluding from the property valued by him as a rating base (his report, paragraph 21), the following items listed in Exhibit C, class A, towit, item 9, the Phoebe Strong ranch, which should have been valued in the sum of at least eighteen thousand, eighty dollars ($18,080.00); item 10, the William Strong ranch which should have been valued in the sum of at least fifteen thousand dollars ($15,000) (deducting filter site); item 11, the Becky Archer ranch, which should have been valued in the sum of at least thirteen thousand, one hundred dollars ($13,100); item 12, the Frank Archer ranch, which should have been valued in the sum of at least thirty-seven thousand, nine hundred dollars ($37,900.00); although the evidence shows without substantial dispute that the retention of said ranches is essential to the full protection and conservation of the water rights necessary for the supply of the city and its inhabitants (plaintiff's abstract, page 197; plaintiff's proof, volume V, page 2166; plaintiff's abstract, page 36; plaintiff's proof, volume III, page 1392; plaintiff's abstract, page 570; defendant's proof, volume VI, page 3471; plaintiff's abstract, pages 342, 344 and 348; defendant's proof, volume 2, pages 807, 822, 873, 874).

XVI.

1435 Because the Master erred in deducting from and not including in the property valued by him as a rating base the following items of real estate specifically mentioned in his report, paragraph 21 (the items being those under class A, Exhibit C); Item 13, Mountain Reservoir site, which should have been valued in the sum of at least six thousand, seventy-five dollars ($6,075.00); item 20-a, Woodbury land, which should have been valued in the sum of at least fifteen hundred dollars ($1500.00); item 23 De Lappe Place, which should have been valued in the sum of at least six hundred seventy-six dollars ($676.00); item 24, Cottage Hill tank site, which should have been valued in the sum of at least five thousand, two hundred and eight dollars ($5208.00); item 30, office and superintendent's residence, which should have been valued in the sum of at least three thousand, two hundred and fifty dollars ($3250.00); item 32, lots in Cottage Hill, which should have been valued in the sum of at least six thousand, eight hundred and eight dollars ($6808.00); for the reason that the evidence shows without substantial dispute that said items of property, if not in actual use, were provided and held for use in the reasonably near

future in connection with the waterworks system and as a part thereof.

XVII.

Because the Master erred in excluding from and not including in the property valued by him for a rating base (his report, paragraph 21) the following item of Class A, Exhibit C, towit: Item 15, Harriman Lake site, which should have been valued in the sum of at least eight thousand, four hundred and fifty dollars
1436 ($8450.00); although the evidence shows without dispute that the same, and the structure thereon presently useful in connection with the waterworks system and is fulfilling a necessary and valuable function in that regard (plaintiff's abstract, page 205; plaintiff's proof, vol. V, p. 2255; plaintiff's abstract, p. 33, plaintiff's proof, vol. II, p. 477.)

XVIII.

Because the Master erred in excluding from consideration and not including in the property valued by him as a rating base, the following item of Class A, Exhibit C, towit: Item 19, Sullivan Reservoir site, which should have been valued in the sum of at least two thousand dollars ($2000.00); although the evidence shows without substantial dispute that the same and the structures situate thereon, while not actually in use at the present moment, are provided for use in the reasonably near future and are a valuable part of the waterworks system or plant (plaintiff's abstract, p. 154; plaintiff's proof, vol. IV, pp. 1788, 1790, 1791, 1792; plaintiff's abstract, p. 347; defendant's proof, vol. II, pp. 858-863).

XIX.

Because the Master erred (his report, paragraphs 25 and 26) in valuing the water rights of the company upon the basis of their irrigation worth only, without consideration of their peculiar availability and adaptability for the purposes of city supply, and without any addition to their value on that account, although the evidence shows without substantial dispute that they possess high ad-
1437 ditional value because of that fact (plaintiff's abstract, pp. 189, 190, 194, 219, 258, 553, 555, 608, 621; plaintiff's proof, vol. V., pp. 2105, 2141, 2142, 2382, 2383, 2384; vol. VI, pp. 2855, 2861; defendant's proof, vol. IV, pp. 1802, 1804, 1805; vol. V, pp. 2782/2784, 2794; vol. VI, 3045, 3151; plaintiff's abstract, pp. 190, 199, 219, 554, 555; plaintiff's proof, vol. V. pp. 2106, 2107, 2110, 2183, 2382).

XX.

Because the Master erred in allowing as the value of the Company's water rights (his report, paragraph 27) only the sum of two

million, nine hundred forty-seven thousand, six hundred seventeen dollars ($2,947,617), whereas, as the evidence shows without substantial dispute, said allowance should have been at least the sum of three million, five hundred thirty thousand dollars ($3,530,000.) (Exhibit C, Class B, p. 118).

XXI.

Because the Master erred (his report, paragraphs 28 and 29) in allowing for the Lake Cheesman water right only the sum of one million, five hundred eleven thousand, one hundred and seventeen dollars ($1,511,117), whereas the evidence shows without substantial dispute that the value of said water right is at least the sum of two million dollars ($2,000,000) (Exhibit C, class B, item 12, p. 117).

XXII.

Because the Master erred in assuming as the unit price per acre foot upon which to determine the valuation of the Lake
1438 Cheesman water right, the sum of fifty-five dollars ($55.00) (his report, paragraph 28,) whereas the evidence shows without substantial dispute that a unit price or value, even for irrigation purposes, should be not less than sixty dollars ($60.00) per acre foot (plaintiff's abstract, pp. 202, 228, 233, 235, 251, 252; plaintiff's proof, vol. V. p. 2215; vol. VI. pp. 2448, 2521, 2533, 2686, 2695; also, plaintiff's abstract, pp. 238, 239, 257; plaintiff's proof, vol. VI. pp. 2534, 2564, 2571, 2845, 2848).

XXIII.

Because the Master erred in finding only fifty-four thousand (54000) acre feet to be the quantity of the water storable in and available for delivery annually by the Cheesman Reservoir (his report, paragraph 29), whereas the evidence shows without substantial dispute that said quantity should be at least fifty-seven thousand, sixteen (57,016) acre feet, on the basis of an assured supply worth sixty dollars ($60.00) per acre foot, and a greater quantity if a unit price of less than sixty dollars ($60.00) per acre foot is applied, because of less certainty in the supply on the larger draft (plaintiff's abstract, p. 195; plaintiff's proof, vol. V. p. 2147, 2153, Exhibit A 31).

XXIV.

Because the Master allowed only the sum of nine hundred forty-nine thousand, five hundred dollars ($949,500) as the value of group 1 of the water rights (his report, paragraphs 27 and 30), said group 1 consisting of the following items of Class B of Exhibit C, towit:
Items 1, 2, 3, 4, 13, 14, 15, 16, 17 and 21; whereas the evi-
1439 dence showed without substantial dispute that the value of

said group of water rights was not less than the sum of one million, one hundred and fifty thousand dollars ($1,150,000) (Exhibit C, class B, p. 117).

XXV.

Because the Master took as the annual yield of said group 1 of water rights only the quantity of thirty-seven thousand (37,000) acre feet (his report, paragraph 30), whereas the evidence shows without substantial dispute that said yield for irrigation purposes would be not less than forty thousand (40,000) acre feet and for purposes of city supply, a much larger quantity (plaintiff's abstract, pp. 121, 122, 191, 218).

XXVI.

Because the Master erred in employing the unit price or value of fifty-five dollars per acre foot in arriving at the value of said group 1 of water rights (his report, paragraph 30), whereas the evidence shows without substantial dispute that said unit price or value should be at least sixty dollars ($60.00) per acre foot (see references under similar exception relating to Lake Cheesman water right, supra, paragraph 22).

XXVII.

Because the Master erred in his valuation of water rights and found too low a value therefor, in that, after having determined their value for irrigation purposes only, ignoring their added value as sources of city supply, he deducted therefrom the reproduction cost of the water works structures and lands appurtenant
1440 thereto (his report, paragraph 27 to 32, inclusive) although the evidence shows without substantial dispute that such water works structures are much more costly than those used in irrigation, and although the evidence also shows without substantial dispute that the cost of reproduction, and therefore the value, of such or similar water rights equally available and adapted to the purpose of city supply, would be more than their total gross value for irrigation purposes, without deduction for any structures or other appurtenances whatsoever (plaintiff's abstract p. 189, 190, 194, 219, 258, 552, 553, 555, 608, 621; plaintiff's proof, vol. V., p. 2105, 2141, 2142, 2382, 2383, 2384; vol. VI, p. 2855, 2861; defendant's proof, vol. IV, pp. 1800, 1802, 1804, 1805, 1807; vol. V, p. 2782, 2784, 2780, 2794; vol. VI, p. 3045, 3051; also plaintiff's abstract, p. 190, 199, 219, 554, 555; plaintiff's proof, vol. V, p. 2106, 2107, 2110, 2183, 2382).

XXVIII.

Because the Master excluded (his report, paragraph 36) from and did not include in the property valued for a rating base the Harri-

man Lake structures, which should have been valued in the sum of at least eleven thousand eight hundred and fifty-eight dollars ($11,858.00) (Exhibit C, class I, item 6, p. 245;) (see references under exception 17 supra, relative to exclusion of Harriman Lake site).

XXIX.

Because the Master excluded from and did not include in the property valued for a rating base the office and superintend-
1441 ent's residence at Littleton, which should have been valued in the sum of at least eight thousand, five hundred and five dollars ($8,505.00) (Exhibit C, class J, items 2-*b*, 3 and 6-*a*) (see his report, paragraph 37, and references under exception 16 supra relating to exclusion of land upon which these improvements are located).

XXX.

Because the Master excluded from and did not include in the property valued as a rating base the structures at Sullivan Reservoir, which should have been valued at the sum of at least one hundred twenty-two thousand, five hundred and thirty-four dollars ($122,-534.00) (Exhibit C, class L, item 5, p. 302) (see his report, paragraph 38, and reference under exception 18 supra, relating to exclusion of Sullivan Reservoir site).

XXXI.

Because the Master erred in excluding and deducting (his report, paragraph 39) from his estimate of reproduction cost and consequent value of the distribution pipe system, the item of paving over mains, which should have been valued at least in the sum of five hundred thirty nine thousand, five hundred and fifty-eight dollars, ($539,-558.00) (Exhibit C, class S, item 17, p. 369,370), although the evidence shows without substantial dispute that the additional value in the plant arising therefrom is at least as much as the amount claimed therefor in Exhibit C; (plaintiff's abstract, p. 77, 91, 111, 143, 161, 349, 355; plaintiff's proof, vol. III, pp. 901, 902,
1442 1112, 1329; vol. IV, p. 1840, 1841, 1841-*a*, 1686, 1687, 1691, 1693; defendant's proof, vol. II, p. 754, 879, 880).

XXXII.

Because the Master excluded and deducted (his report, paragraph 39) from his estimate of reproduction cost and consequent value of the distribution pipe system, items of added cost occasioned by railway tracks and other obstructions, amounting to the sum of at least one hundred and nine thousand, nine hundred and ninety-two dollars ($109,992.00) (Exhibit C, class S, items 19-*c*, 20-*a*,-*b* and -*c*, and 21-*a*, p. 386, 387, 389), although the evidence shows without substantial dispute that the value of the distribution system is en-

hanced because of said matters in an amount not less than the sum claimed therefor in Exhibit C (plaintiff's abstract, p. 884; plaintiff's proof, vol. VIII, p. 3749 et. seq).

XXXIII.

Because the Master excluded and deducted (his report, paragraph 39) from his estimate of reproduction cost and consequent value of the distribution pipe system, the item of taps for private consumers, which should have been valued in the sum of at least one hundred forty thousand, thirty-eight dollars ($140,038.) (Exhibit C, class S, item 25, p. 390), although the evidence shows without substantial dispute that the value of the Company's distribution system is enhanced by reason of the existence of such taps which have become the property of the Company, by at least the amount
1443 claimed therefor in Exhibit C (plaintiff's abstract, p. 155, 167; plaintiff's proof, vol. IV, p. 1890).

XXXIV.

Because the Master excluded from the personal property valued by him for a rating base (his report, paragraph 40), the personal property on the Platte Valley ranches, used for farming purposes, which should have been valued in the sum of approximately twenty-eight thousand, one hundred fifty-nine *thousand* dollars ($28,-159.00) (Exhibit C, class T, items 19 and 20, p. 393), although the retention of said ranches and the conducting of farming operations thereon is shown by the evidence without substantial dispute to be necessary to the proper conservation and full preservation of the water rights used for city supply (see references under exception 15 supra, relating to exclusion of the ranch lands).

XXXV.

Because the Master in his valuation of the personal property (Exhibit C, class T) excluded (his report, paragraph 40), all overhead expense, amounting to approximately twenty-five thousand dollars ($25,000) although the evidence shows without substantial dispute that such expense is necessarily incurred in assembling, arranging and preserving such property, and that it adds to the value thereof not less than the amounts claimed on that account in Exhibit C (plaintiff's abstract, p. 279, 280; defendant's proof, vol. I, p. 193, et seq. p. 247).

1444 XXXVI.

Because the Master excluded (his report, paragraph 42) from his estimate of reproduction cost and consequent value, the item of preliminary expense and cost of organization, which should have been valued at the sum of at least one hundred and twenty thou-

sand dollars ($120,000) (Exhibit C, p. 64) although the evidence shows without substantial dispute that such cost must be necessarily incurred in addition to all overhead expense covered by other allowances, and that it adds value to the plant in at least the amount claimed therefor in Exhibit C (plaintiff's abstract, p. 144, plaintiff's proof, vol IV, p. 1700).

XXXVII.

Because the Master excluded (his report, paragraph 43) and failed to make any allowance whatsoever for working capital, although the evidence shows without substantial dispute that it is necessary for the Company to supply a working capital of not less than one hundred thousand dollars ($100,000) (plaintiff's Exhibit A-24; plaintiff's abstract, p. 150; plaintiff's proof, vol. IV, p. 1750).

XXXVIII.

Because the Master placed the going value of the plant at only eight hundred thousand dollars ($800,000) (his report, paragraph 46), whereas the evidence shows without substantial dispute that said value should be at least one million, two hundred thousand dollars ($1,200,000) (Exhibit C, p. 64; plaintiff's abstract,
1445 p. 64, 71, 73, 77, 83, 102, 107, 114, 574; also plaintiff's abstract, p. 147; plaintiff's proof, vol. IV, p. 1718).

Respectfully submitted,

C. C. DORSEY,
GERALD HUGHES,
Solicitors for The Denver Union Water Company.

WM. V. HODGES,
Of Counsel.

(Endorsed:) No. 6274. In Equity. United States District Court, The Denver Union Water Company, a corporation, Plaintiff vs. The City and County of Denver, et al., Defendants. Plaintiff's Exceptions to report of Special Master. Filed Nov. 5, 1915, Charles W. Bishop, Clerk. Hughes & Dorsey, William V. Hodges, Attorneys for plaintiff.

UNITED STATES OF AMERICA,
District of Colorado, ss:

In the District Court of the United States for the District of Colorado.

In Equity. No. 6274.

THE DENVER UNION WATER COMPANY, a Corporation, Complainant,
vs.
THE CITY AND COUNTY OF DENVER et al., Defendants.

Exceptions to Findings and Report of Special Master.

Come now the City and County of Denver, a municipal corporation, and A. Lincoln Fellows and Armour C. Anderson, constituting

the Public Utilities Commission of the city and county of Denver, defendants in the above-entitled cause, and except to the findings and report of W. J. Chinn, Esq., the Special Master in said
1446 cause, filed in this cause on the 7th day of October, A. D. 1915, and for cause of exception show:

1st. That in paragraph or finding No. 4 of the report of said Master, and in subdivision (*a*) thereof, he discloses that one of the questions determined by him "was the reasonable value of the property used by the Water Company in delivering water to the City and its inhabitants" and that in his said report as a whole he undertakes to and does find and return the figures by him determined to be the figures of reasonable value of the property used by the complainant company in delivering water to the City and its inhabitants; whereas the said Master ought to have found and determined the reasonable value only of the property used and useful in delivering water to the city and county and its inhabitants, and should have excluded the value of all property used which was not found by him useful and necessary to be used in so delivering water to the city and county and its inhabitants.

2nd. That the Master has in his said report, and in paragraph or finding No. 12, and the table attached to said paragraph, stated and certified, and in the whole of his said report has found, the reasonable value of the plant of the complainant company on May 1st, 1914, to be $13,415,899.00, and in so finding has included the gross reproduction cost, including engineering and contingencies, less accrued depreciation, as the present reasonable value of said plant and property; whereas the Master ought to have used the fair
1447 contract cost new of the said property and plant, instead of the gross reproduction cost, less accrued depreciation, in determining the present reasonable value of the property of the complainant Company used and useful in supplying the City and County of Denver and its inhabitants with water, for that present reasonable value cannot in any event exceed fair contract cost new of the property used in supplying the City and County of Denver and its inhabitants with water.

3rd. That the Master has in his said report stated and certified in paragraph or finding No. 14 of said report, that he has included in table No. 1, which forms a part of paragraph No. 12, the item known as item No. 27, Lake Archer lands, $208,306.00, and the item known as item No. 26, Tail Race from West Denver Pumping Station, $10,731.00; whereas the Master ought to have found that said items were property not useful or necessary to be used by the complainant Company in supplying the City and County of Denver and its inhabitants with water.

4th. That the Master has in his said report stated and certified, in paragraph or finding No. 18 of said report, that he finds item No. 1, Class A, (Exhibit "C" pages 111-115,) known as Lake Cheesman Reservoir lands, also referred to in paragraph or finding No. 14 of the Master's report, as of the reasonable value of $160,000.00, basing his valuation upon the cost of said lands to the complainant Com-

pany; whereas the Master ought to have found that said lands
1448 were of a value not exceeding $40,799.00, for that the cost of said lands, as indicated by the evidence, was not indicative of the value thereof, but was in truth and in fact merely the price paid by the complainant Company to one of its subsidiary or interested companies, and in effect a price paid to itself.

5th. That the Master has in his said report stated and certified, in paragraph or finding No. 24, that the complainant Company owns the water rights claimed by it by original appropriation being items Nos. 4, 5, 6, 7, 8, 9, 10 and 12, Exhibit "C," because of its diversion of waters under such appropriations from the natural streams of Colorado, used by it in supplying its consumers in the city and county of Denver, and because contracts between the Water Company and its private consumers have been simply permits or licenses, upon which rates have been paid by the consumers; whereas the Master ought to have found that the City and County of Denver and its inhabitants as an entity has been and is now the consumer of all water appropriated by means of said appropriations initiated by said complainant Company, and the owner of such water rights, and that for purposes of determining fair value for rate-making purposes there should be taken into consideration only the cost of the structures and the cost of initiation of such appropriations.

6th. That the Master has in his said report, and in paragraph or finding No. 27, stated and certified that item No. 4, in group one, should be included; whereas the Master ought to have found
1449 that item No. 4 should have been in part excluded, because said item No. 4 includes a claimed appropriation, and was of 3.14 cubic feet of water per second of time in the non-irrigating season; whereas in truth and in fact there is no such thing as the non-irrigating season, and said amount of water, and the appropriation thereof, the right and title thereto, rests in others than the complainant Company, towit, in the Lehow Estate.

7th. That the Master has in his said report, and in paragraph or finding No. 27, stated and certified that items 5 and 6, being the appropriation of predecessors of complainant Company described on page 16 of Exhibit "C," were of a value of $200,000.00, and has included said items and such valuation in his said findings and in his whole report; whereas the Master ought to have found that the ownership of said water rights is in the City and County of Denver and its inhabitants, and that in the determination of fair value for rate-making purposes no value ought to be assigned to such water rights as if owned by the complainant Company.

8th. That the Master has in his said report, and in paragraph or finding No. 27, stated and certified that item 7, the Cherry Creek Galleries, being the appropriation of predecessors of complainant Company described on page 16 of Exhibit "C," was of a value of $66,000.00, and has included said item and such valuation in his findings and in his whole report; whereas the Master ought to have found that the ownership of said water rights is in the city
1450 and county of Denver and its inhabitants, and that in the determination of fair value for rate-making purposes no

value ought to be assigned to such water rights as if owned by the complainant Company.

9th. That the Master has in his said report, and in paragraph or finding No. 27, stated and certified that item 8, the Platte Canon Filter Galleries, being the appropriation of predecessors of complainant Company described on page 16 of Exhibit "C," was of a value of $65,000.00 and has included said item and such valuation in his findings and in his whole report; whereas the Master ought to have found that the ownership of said water rights is in the city and county of Denver and its inhabitants, and that in the determination of fair value for rate-making purposes no value ought to be assigned to such water rights as if owned by the complainant Company.

10. That the Master has in his said report, and in paragraph or finding No. 27, stated and certified that item 9, Platte Canon 34-inch conduit, being the appropriation of predecessors of complainant Company described on page 16 of Exhibit "C" was of a value of $24,750.00, and has included said item in such valuation in his said findings and in his whole report; whereas the Master ought to have found that the ownership of said water rights is in the city and county of Denver and its inhabitants, and that in the determination of fair value for rate-making purposes no value ought to be assigned to such water rights as if owned by the complainant Company.

11th. That the Master has in his said report, and in para-
1451 graph or finding No. 27, stated and certified that item 10, Platte Canon 40-inch conduit, being the appropriation of predecessors of complainant Company described on page 16 of Exhibit "C," was of a value of $30,000.00, and has included said item in such valuation in his said findings and in his whole report; whereas the Master ought to have found that the ownership of said water rights is in the City and County of Denver and its inhabitants, and that in the determination of fair value for rate-making purposes no value ought to be assigned to such water rights as if owned by the complainant Company.

12th. That the Master has in his said report, and in paragraph or finding No. 27, stated and certified that item 12, Lake Cheesman, being the appropriation of predecessors of complainant Company described on page 16 of Exhibit "C" was of a value of $1,611,-117.00, and has included said item in such valuation in his said findings and in this whole report, whereas the Master ought to have found that the ownership of said water rights is in the City and County of Denver and its inhabitants, and that in the determination of fair value for rate-making purposes no value ought to be assigned to such water rights as if owned by the complainant Company. And for the further reason that the appropriation of said right, made by The Denver Union Water Company, complainant herein, was expressly made for the use and benefit of the City and County of Denver and its inhabitants, and upon the representations made by said complainant Company, that its appropriations were

for the benefit of the said City and County and its inhabitants,
1452 and for no other purpose the said complainant Company acquired valuable rights, privileges and concessions, and is estopped to deny ownership by the said City and County and its inhabitants of the waters so appropriated for the benefit of said City and County and its inhabitants.

13th. That the Master has in his said report, and in paragraph or finding No. 28 of said report, found and determined that the unit price of $55.00 per acre foot should be applied in determining the value of the water rights of complainant Company, and particularly applied to the so-called Lake Cheesman rights and to the estimated volume of water yielded by the water rights included in Group one of Class B (Exhibit "C," pages 117-118); whereas the Master ought to have found that a unit price of not to exceed $40.00 per acre foot should be used in determining the value of the water rights of the complainant Company actually owned by it, by applying such unit price of $40.00 per acre foot to the volume of water yielded by such rights, and ought not to have applied any such unit price to the volume of water yielded by those rights ownership to which exists in the City and County of Denver and its inhabitants.

14th. That the Master has in his said report, and in paragraph or finding No. 29 thereof, applied the unit price of $55.00 per acre foot to an estimated yield of 54,000 acre feet from Cheesman Reservoir, and has found the gross value of such volume of water to be $2,970,000.00, and, after deducting the value of Lake Cheesman structures, previously found by him, finds a net value of
1453 Lake Cheesman water rights to be $1,611,117, which value he has assigned as their present value; whereas the Master ought to have found that the ownership of the water appropriated through the Lake Cheesman structures, and the appropriations therefor, is in the City and County of Denver and its inhabitants, and that the value thereof should be excluded from consideration in determining the fair value of complainant Company's property for rate-making purposes.

15th. That the Master has in his said report, and in paragraph or finding No. 30 thereof, stated and certified that he has applied the unit price of $55.00 per acre foot to the estimated yield of the water rights in Group one (Class B, Water Rights, Exhibit "C"); whereas the Master ought to have found that the unit price to be applied to the volume of yield of such rights should not in any event exceed the sum of $40.00 per acre foot, and that the estimated yield should not have exceeded 20,000 acre feet.

16th. That the Master has in his said report, and in paragraph or finding No. 41 thereof, stated and certified that $805,000.00 should be allowed for interest during construction as reasonable and fair; whereas the Master ought to have found that no allowance whatever should be made for interest during construction in determining the present fair value of complainant's property for rate-making purposes, if there is to be allowed also the item of "Going Concern" value, and because the plant of complainant Company was

not constructed as a new and complete plant, in the con-
1454 struction of which interest during construction might be an item for consideration, but was a plant constructed piecemeal and from time to time, and, except for a very inconsiderable portion thereof, has been constructed out of income and with money derived through the payment of water rates in advance.

17th. That the Master has in his said report, and in paragraph No. 46 thereof, stated and certified that $800,000.00 is a sum reasonable and fair to be allowed as the intangible element of "Going Concern Value" and proper to be included in the fair value of complainant's property for rate-making purposes; whereas the Master ought to have found that, having previously fully allowed the items of interest during construction and engineering and contingencies, which items go to make up the principal portion of overhead charges, there should be nothing further allowed for "Going Concern Value" and further should have found that in appraising the property of complainant Company at reproduction cost less accrued depreciation, including engineering, contingencies and interest during construction, the property had been appraised as an assembled and established plant, doing business and earning money, and that the intangible element of so-called "Going Concern Value" ought not thereafter to have been added, and ought not to be included in the determination of the present fair value of complainant's property for rate-making purposes.

18th. That the Master erred in his said report, and in his allowance of valuations, by duplicating certain values (as particu-
1455 larly appears from Table 1 of paragraph 12 of the report), in that he has included in the "Gross Reproduction Cost" an allowance of "12½% for Engineering and Contingencies," and an allowance of $699,545.00 for "Interest During Construction," and an allowance of $800,000.00 for "Going Concern Value" whereas the said allowance of "12½% for Engineering and Contingencies," and the allowance of $699,545.00 for "Interest during Construction" are what are commonly known as overhead charges and go to make up the item of "Going Concern Value."

19th. That the Master erred in making as great an allowance as $800,000.00 or any allowance at all, for "Going Concern Value" (paragraphs 12 and 46 of the Master's report), because, as appears by the uncontradicted evidence in the case, the franchise of the complainant Company has expired, and the complainant Company had not on May 1st, 1914, and has not since, and has not now, any franchise to do business in the city and county of Denver.

20th. That the Master has, throughout his entire report, attached undue weight and importance to the testimony of the witness Metcalf and Anderson, who were witnesses for the complainant, and has as the result thereof placed excessive value upon much of the property of the complainant Company.

21st. That the Master has in his said report, and in paragraph 50 thereof, stated and certified that $140,000.00 is allowed for "Annual Depreciation;" whereas the Master ought to have found that

nothing should be allowed for "Annual Depreciation" as the
1456 same is included annually in the item of "Operating Expenses."

22nd. That the Master has in his said report, and in paragraphs 8 and 53 thereof, found, stated and certified that the rate-making ordinance, being Ordinance No. 26, Series of 1914, does not permit the Water Company to earn for the use of its property such compensation as is fair to it and to the City, and that the enforcement of said ordinance will result in the taking of the use of said property without just compensation, and that said ordinance is invalid; whereas the Master ought to have found that said ordinance did permit the Water Company to earn for the use of its property such compensation as is fair to it and to the City, and that the enforcement of said ordinance will not result in the taking of the use of said property without just compensation, and that the same is valid.

Wherefore, these defendants pray that the report of the Special Master herein be not confirmed, and that the said report be modified, changed and altered, to the end that the errors hereinbefore pointed out and complained of be corrected, and that the vaildity of the rate-making ordinance herein be sustained.

GEO. L. NYE,
Attorney for Defendants A. Lincoln, Fellows, and Armour C. Anderson, Constituting the Public Utilities Commission of the City and County of Denver.

J. A. MARSH,
Attorney for Defendant City and County of Denver.

1457 (Endorsed:) No. 6274. In the United States District Court of the District of Colorado. The Denver Union Water Company, a Corporation, Complainant, versus The City and County of Denver, et al., Defendants. Defendants' Exceptions to Findings and Report of Special Master. Filed Nov. 5, 1915, Charles W. Bishop, Clerk. Thomas, Bryant, Nye & Malburn, George L. Nye, James A. Marsh, Attorneys for Defendants. 621-629 Ernest and Cranmer Building, Denver, Colo.

Fifty-Sixth Day, November Term, Friday, January 28th, A. D. 1916.

Present: The Honorable Robert E. Lewis, district judge, and other officers as noted on the second day of November, A. D. 1915.

1458 In Equity. 6274.

THE DENVER UNION WATER COMPANY
vs.
THE CITY AND COUNTY OF DENVER et al.

Bill for Injunction and for Other Relief.

And now on this January 28th, A. D. 1916, this cause came on again to be heard in open court, and the exceptions to the report

of the special master, William J. Chinn, Esq., came on for consideration; thereupon Clayton C. Dorsey, Esq., appearing as solicitor for the complainant, announced to the court that it was his opinion that under the terms of appointment of said special master there were no questions raised by the exceptions to said report by either of the parties that were open for consideration and that could be heard by the court, and George L. Nye, Esq., as solicitor for the Public Utilities Commission of the City and County of Denver, one of the defendants, announced to the court that he was of like opinion as to all questions of fact raised by said exceptions, but that he was of opinion that there were questions purely of law arising on said exceptions that could be heard, and J. A. Marsh, Esq., as solicitor for the City and County of Denver, the other of said defendants, announced that he would not commit himself as to what, if any, questions raised by said exceptions were or were not open for consideration, except that he concurred in the announcement of
1459 George L. Nye, Esq., that questions purely of law raised by said exceptions were properly now open for presentation and consideration by the court.

Thereupon, the court having heard counsel and being now sufficiently advised in the premises, and being of opinion that under the terms of the appointment of said special master questions of fact raised by exceptions to his report by the respective parties ought not to be and are not open for consideration and determination by the court, but that the finding of said special master thereon ought to be and is final and conclusive; and being further of the opinion that said exceptions do not raise questions of pure law for determination by the court material to the cause and that can be considered and determined by the court without an examination of and conclusion as to the facts, doth thereupon order and direct that the exceptions of the respective parties to said report be stricken and for naught held, that the report of said special master, W. J. Chinn, Esq., be and is in all things confirmed, and that the cause pass to final decree for complainant in accordance with the findings and recommendations of said special master.

1460 In the District Court of the United States for the District of Colorado.

In Equity. No. 6274.

THE DENVER UNION WATER COMPANY, a Corporation, Complainant,
vs.
THE CITY AND COUNTY OF DENVER et al., Defendants.

Come now the defendants in the above-entitled cause, and move the Court:

1st. To modify and correct the "Order appointing Special Master" in this cause by adding thereto, after the word "consenting" in line six of said order, the following: "to the individual selected as Special Master."

2nd. To permit these defendants to file their objections and exceptions to the findings and conclusions of the Master before the Master, and to direct that such objections and exceptions be passed upon by the Master.

3rd. To modify the order entered on Friday, January 28th, in the above-entitled cause, directing "that the exceptions of the respective parties to said report be stricken and for naught held", by causing the same to read "that the exceptions of the respective parties to said report be and the same are overruled."

And for grounds of this motion these defendants show to the court:

1. That the original "Order appointing Special Master"
1461 in this cause was made by the court; that the parties to the action were only required to and did only consent to the individual appointed.

2. That the order itself shows that the reference to the Special Master was only "for the purpose of taking all testimony in the suit and reporting to the Court his findings of fact and such conclusions of law as he may deem essential to the proper advisement of the Court."

3. That it was understood by Court and counsel, and by all parties to said proceeding before the Special Master, that the report of the Special Master would be subject to review and confirmation by the Court.

4. That upon the argument upon the exception on January 28th, 1916, the Court foreclosed argument upon the question of water rights and water titles, by saying that such questions could be taken to the appellate court for review, and that without the modifications of the order suggested herein it may be impossible to obtain a review in an appellate court.

5. That unless objections and exceptions of these defendants are ruled upon by the Master it may be impossible to have the findings and conclusions of the Master reviewed by an appellate court.

J. A. MARSH,
City Attorney.
GEORGE L. NYE,
Attorney for Utilities Commission.

1462 [Endorsed:] 6274. U. S. District Court, District of Colorado. The Denver Union Water Company vs. The City and County of Denver et al. Petition for Correction of Record. Filed Feb. 1, 1916. Charles W. Bishop, Clerk.

Fifty-eighth Day, November Term, Tuesday, February 1st, A. D. 1916.

Present: The Honorable Robert E. Lewis, district judge, and other officers as noted on the second day of November, A. D. 1915.

6274. In Equity.

THE DENVER UNION WATER COMPANY
vs.
THE CITY AND COUNTY OF DENVER et al.

Bill for Injunction and for Other Relief.

This cause comes on now to be heard upon the petition of the defendants to modify and correct the orders heretofore entered herein, on, towit, the twenty-first day of May, A. D. 1914, and
1463 the twenty-eighth day of January, A. D. 1916, and is argued by counsel, J. A. Marsh, Esquire, appearing as solicitor for the City and County of Denver and others, George L. Nye, Esquire, appearing as solicitor for the defendant, The Public Utilities Commission of the City and County of Denver. And thereupon, on consideration thereof,

It is ordered by the court that the said petition be, and the same is hereby, denied.

And thereupon, the defendants by their counsel then and there further duly excepted to the recital in said orders of the twenty-first day of May, A. D. 1914, and the twenty-eighth day of January, A. D. 1916, referred to in said petition and to the retention thereof as it now appears in said orders.

In Equity.

6274.

THE DENVER UNION WATER COMPANY
vs.
THE CITY AND COUNTY OF DENVER, WILLIAM H. SHARPLEY, CLAIR J. PITCHER, ALEXANDER NISBET, JOHN B. HUNTER, AND LEWIS C. GREENLEE as Commissioners, Members of and Constituting the Council of the City and County of Denver; William H. Sharpley, as Mayor and Commissioner of Social Welfare of The City and County of Denver; Clair J. Pitcher, as Commissioner of Finance of the City and County of Denver; Alexander Nisbet, as Commissioner
1464 of Safety of the City and County of Denver; John B. Hunter, as Commissioner of Improvements of the City and County of Denver; Lewis C. Greenlee, as Commissioner of Property of the City and County of Denver; James F. Markey, as Auditor of the City and County of Denver; Armour C. Anderson and A. Lincoln Fellows, as Members of and Constituting the Public Utilities Commission of the City and County of Denver.

Bill for Injunction and for Other Relief.

This cause came on to be heard at this term and was argued by counsel; and thereupon, upon consideration thereof, it was ordered, adjudged and decreed as follows, viz:

1. That the report of the Special Master, W. J. Chinn, which report bears date October 5, 1915, and was filed herein on October 6, 1915, be, and the same hereby is, in all particulars, approved and confirmed, all exceptions thereto of each of the parties to this cause having heretofore been stricken.

2. That Ordinance No. 26, Series 1914 of the Ordinances of the City and County of Denver, a copy of which Ordinance is Exhibit A to the bill of complaint herein, and which Ordinance is entitled "An Ordinance to regulate charges for water furnished the City and County of Denver and its inhabitants by The Denver Union
1465 Water Company, while said Company shall continue so to do, as a tenant by sufferance, and to prohibit discriminatory rates and charges and provide a penalty for violation", and each and every part, portion, provision and requirement therein contained, including the schedule of rates and practices therein set forth, be, and the same hereby is, found, declared and adjudged to be in all respects invalid and of no force or effect whatsoever, in that said Ordinance attempts to and does deprive the complainant of its property without due process of law, and takes the private property of said complainant for public use without just compensation.

3. That the defendants herein, and each of them, their respective successors and the successors in office respectively of the defendant officials, and each of them, the officers, agents, representatives and attorneys of them, and each of them, as well as all of the consumers of water in the City and County of Denver receiving water or service from the plaintiff Company, and the officers, agents, representatives and attorneys of them, and each of them, be and hereby are, and each of them hereby is, perpetually enjoined and prohibited from individually or in combination with others, directly or indirectly, enforcing, or attempting to enforce, said Ordinance No. 26 of the Series of 1914 aforesaid, or any of the rates, terms, provisions or requirements thereof.

1466 4. That the plaintiff- herein do have and recover of and from the defendants its costs in this behalf expended and incurred to be taxed, and let judgment be entered therefor.

UNITED STATES OF AMERICA,
District of Colorado, ss:

In the District Court of the United States for the District of Colorado.

No. 6274. In Equity.

THE DENVER UNION WATER COMPANY, a Corporation, Complainant,
vs.
CITY AND COUNTY OF DENVER, WILLIAM H. SHARPLEY, CLAIR J. Pitcher, Alexander Nisbet, John B. Hunter and Lewis C. Greenlee, as Commissioners, Members of and Constituting the Council of the City and County of Denver; William H. Sharpley, as Mayor and Commissioner of Social Welfare of the City and County of Denver; Clair J. Pitcher, as Commissioner of Finance of the City

and County of Denver; Alexander Nisbet, as Commissioner of Safety of the City and County of Denver; John B. Hunter, as Commissioner of Improvements of the City and County of Denver; Lewis C. Greenlee, as Commissioner of Property of the City and County of Denver; James F. Markey, as Auditor of the City and County of Denver; Armour C. Anderson and A. Lincoln Fellows, as Members of and Constituting the Public Utilities Com-
1467 mission of the City and County of Denver, Defendants.

Petition for Substitution of Parties.

To the Hon. Robert E. Lewis, District Judge:

Come now the City and County of Denver, a municipal corporation, James F. Markey as Auditor of the city and county of Denver, and Armour C. Anderson as member of and constituting the Public Utilities Commission of the city and county of Denver, defendants above named, together with the following named persons, towit: Robert W. Speer, as Mayor of the city and county of Denver; W. F. R. Mills, as Manager of Improvements and Parks of the city and county of Denver; Clair J. Pitcher, as Manager of Revenue of the city and county of Denver; William H. Sharpley, as Manager of Health and Charity of the city and county of Denver; Dewey C. Bailey, as Manager of Safety and Excise of the city and county of Denver; Charles A. Lammers, as clerk and recorder of the city and county of Denver; Louis F. Bartels, J. A. Burnett, John Conlon, W. C. Danks, D. J. Monaghan, J. B. Rycraft, Thomas O. Spacy, Jesse M. Wheelock and Harry Zimmerhackel, as members of and constituting the council of the city and county of Denver; all as petitioners; and respectfully represent unto this Honorable Court and petition as follows:

1. That, as appears from the bill of complaint in this action, the above named defendant, City and County of Denver, is a
1468 municipal corporation, and that all of the other defendants in this action were at the time the decree was entered herein, officers of said city and county, and that said decree was entered against them and affected them in their capacity as such officers and not otherwise.

2. That on, towit, the 9th day of May, 1916, there became effective and operative in said city and county of Denver an amendment to the charter thereof, by which the form of government thereof was in some respects changed; that at or about the same time certain persons, pursuant to the method prescribed in said amendment to said charter, became officers of the city and county of Denver, and thereby succeeded to the powers and duties of all the officers, with the exception of the defendant James F. Markey as Auditor of the city and county of Denver, and the defendant Armour C. Anderson as member of and constituting the Public Utilities Commission of the city and county of Denver, who were affected by the final decree herein as aforesaid.

3. That on or about said 9th day of May, 1916, pursuant to the provisions and terms of said amendment to said charter, the above

named Robert W. Spear became, and ever since has been and now is, the duly designated, qualified and acting Mayor of the city and county of Denver; and as such officer succeeded to, and became and is now possessed of the powers and duties theretofore possessed by the defendants William H. Sharpley as Mayor and Commissioner
1469 of Social Welfare of the city and county of Denver, Clair J. Pitcher as Commissioner of Finance of the city and county of Denver, Alexander Nisbet as Commissioner of Safety of the city and county of Denver, John B. Hunter as Commissioner of Improvements of the city and county of Denver, and Lewis C. Greenlee as Commissioner of Property of the city and county of Denver; except in so far as said powers and duties, pursuant to the terms of said amendment to said charter, have devolved upon and become vested in other persons hereinafter named.

4. That on or about the said 9th day of May, 1916, pursuant to the provisions and terms of said amendment to said charter, the above named W. F. R. Mills became and ever since has been and now is, the duly appointed, qualified and acting Manager of Improvements and Parks of said city and county of Denver, and as such officer succeeded to, and became and now is possessed of certain of the powers and duties theretofore possessed by the defendant John B. Hunter (as Commissioner of Improvements of the city and county of Denver, and the defendant Lewis C. Greenlee as Commissioner of Property of the city and county of Denver.

5. That on or about the said 9th day of May, 1916, pursuant to the provisions and terms of said amendment to said charter, the above named Clair J. Pitcher became and ever since has been and now is, the duly appointed, qualified and acting Manager of Revenue of the city and county of Denver, and as such officer succeeded to, and became and now is possessed of certain of the powers and duties theretofore possessed by the defendant Clair J. Pitcher as
1470 Commissioner of Finance of the city and county of Denver.

6. That on or about said 9th day of May, 1916, pursuant to the provisions and terms of said amendment to said charter, the above named William H. Sharpley became, ever since has been and now is the duly appointed, qualified and acting Manager of Health and Charity of the city and county of Denver, and as such officer succeeded to, and became and now is possessed of certain of the powers and duties theretofore possessed by the defendant William H. Sharpley as Commissioner of Social Welfare of the city and county of Denver.

7. That on or about said 9th day of May, 1916, pursuant to the provisions and terms of said amendment to said charter, the above named Dewey C. Bailey became, ever since has been and now is, the duly appointed, qualified and acting Manager of Safety and Excise of the city and county of Denver, and as such officer succeeded to, and became and now is possessed of certain of the powers and duties theretofore possessed by the defendant Alexander Nisbet as Commissioner of Safety of the city and county of Denver, and the defendant Clair J. Pitcher as Commissioner of Finance of the city and county of Denver.

8. That on or about the 1st day of June, 1916, pursuant to the provisions and terms of said amendment to said charter, the above named Charles A. Lammers became, ever since has been and now is, the duly appointed, qualified and acting clerk and recorder of the city and county of Denver, and as such officer succeeded in part to, and became and now is possessed of certain of the powers and duties theretofore possessed by the defendant Lewis C. Greenlee as
1471 Commissioner of Property of the city and county of Denver.

9. That on or about the said 9th day of May, 1916, pursuant to the provisions and terms of said amendment to said charter the above named Louis F. Bartels, J. A. Burnett, John Conlon, W. C. Danks, D. J. Monaghan, J. B. Ryeraft, Thomas O. Spacy, Jesse M. Wheelock and Harry Zimmerhackel, became, ever since have been and now are, the duly qualified and acting members of the council of the City and County of Denver; and said nine last named persons at all times since said date have constituted and do now constitute the council of the city and county of Denver and as such Councilmen, the nine last named persons succeeded to and became and are now possessed of the powers and duties theretofore possessed by the defendants William H. Sharpley, Clair J. Pitcher, Alexander Nisbet, John B. Hunter and Lewis C. Greenlee, as members of and constituting the then Council of the city and county of Denver.

10. That heretofore, and on towit, the 1st day of June, 1916, the term of office of the defendant A. Lincoln Fellows, as a member of the Public Utilities Commission of the city and county of Denver, expired, and thereupon by operation of law, the defendant Armour C. Anderson became the sole member of said Public Utilities Commission and that ever since said last mentioned date the said Armour C. Anderson has constituted and now constitutes the Public Utilities Commission of the city and county of Denver.

Wherefore, your petitioners respectfully pray as follows:

That an order of this court may be made substituting
1472 Robert W. Speer as Mayor of the city and county of Denver, W. F. R. Mills as Manager of Improvements and Parks of the city and county of Denver, Clair J. Pitcher as Manager of Revenue of the city and county of Denver, William H. Sharpley as Manager of Health and Charity of the city and county of Denver, Dewey C. Bailey as Manager of Safety and Excise of the city and county of Denver, Charles A. Lammers as clerk and recorder of the city and county of Denver; Louis F. Bartels, J. A. Burnett, John Conlon, W. C. Danks, D. J. Monaghan, J. B. Ryeraft, Thomas O. Spacy, Jesse M. Wheelock and Harry Zimmerhackel, as members of and constituting the Council of the city and county of Denver; and Armour C. Anderson, as sole member of and constituting the Public Utilities Commission of the city and county of Denver; for and in lieu of the defendants William H. Sharpley, Clair J. Pitcher, Alexander Nisbet, John B. Hunter, and Lewis C. Greenlee, as commissioners, members of and constituting the council of the city and county of Denver; William H. Sharpley as Mayor and Commissioner of Social Welfare of the city and county of Denver, Clair J. Pitcher as Commissioner of Finance of the city and county of Denver, Alexander Nisbet as

Commissioner of Safety of the City and County of Denver, John B. Hunter as Commissioner of Improvements of the city and county of Denver; Lewis C. Greenlee as Commissioner of Property of the city and county of Denver; and Armour C. Anderson and A. Lincoln Fellows as members of and constituting the Public Utilities Commission of the city and county of Denver.

1473

CITY AND COUNTY OF DENVER,
A MUNICIPAL CORPORATION,
ARMOUR C. ANDERSON,
As Member of and Constituting the Public Utilities Commission of the City and County of Denver.
ROBERT W. SPEER,
As Mayor of the City and County of Denver;
W. F. R. MILLS,
As Manager of Improvements and Parks of the City and County of Denver;
CLAIR J. PITCHER,
As Manager of Revenue of the City and County of Denver;
WILLIAM H. SHARPLEY,
As Manager of Health and Charity of the City and County of Denver;
DEWEY C. BAILEY,
As Manager of Safety and Excise of the City and County of Denver;
JAMES F. MARKEY,
As Auditor of the City and County of Denver;
CHARLES A. LAMMERS,
As Clerk and Recorder of the City and County of Denver;
LOUIS F. BARTELS,
J. A. BURNETT,
JOHN CONLON,
W. C. DANKS,
D. J. MONAGHAN,
J. B. RYCRAFT,
THOMAS O. SPACY,
JESSE M. WHEELOCK, AND
HARRY ZIMMERHACKEL,
As Members of and Constituting the Council of the City and County of Denver;
By J. A. MARSH,
F. W. SANBORN,
Solicitors for Petitioners.

(Endorsed:) No. 6274. United States District Court. The Denver Union Water Co., complainant, vs. City and County of Denver, et al., defendants. Petition for Substitution of Parties. Filed Jul 29. 1916, Charles W. Bishop, Clerk.

1474 SATURDAY, July 29th, A. D. 1916.

At Chambers, before the Honorable Robert E. Lewis, district judge, the following proceedings were had:

In Equity.

6274.

THE DENVER UNION WATER COMPANY,

vs.

THE CITY AND COUNTY OF DENVER, WILLIAM H. SHARPLEY, CLAIR J. PITCHER, ALEXANDER NISBET, JOHN B. HUNTER AND LEWIS C. GREENLEE AS COMMISSIONERS, MEMBERS OF AND CONSTITUTING THE COUNCIL OF THE CITY AND COUNTY OF DENVER; WILLIAM H. SHARPLEY, AS MAYOR AND COMMISSIONER OF SOCIAL WELFARE OF THE CITY AND COUNTY OF DENVER; CLAIR J. PITCHER AS COMMISSIONER OF FINANCE OF THE CITY AND COUNTY OF DENVER; ALEXANDER NISBET AS COMMISSIONER OF SAFETY OF THE CITY AND COUNTY OF DENVER; JOHN B. HUNTER, AS COMMISSIONER OF IMPROVEMENTS OF THE CITY AND COUNTY OF DENVER; LEWIS C. GREENLEE, AS COMMISSIONER OF PROPERTY OF THE CITY AND COUNTY OF DENVER; JAMES F. MARKEY, AS AUDITOR OF THE CITY AND COUNTY OF DENVER; ARMOUR C. ANDERSON AND A. LINCOLN FELLOWS, AS MEMBERS OF AND CONSTITUTING THE PUBLIC UTILITIES COMMISSION OF THE CITY AND COUNTY OF DENVER.

Bill for Injunction and for Other Relief.

1475 This cause came on to be heard on this twenty-ninth day of July, A. D. 1916, upon the petition of the defendants for an order substituting defendants herein. The defendants appearing by James A. Marsh, Esquire, their solicitor. Thereupon upon consideration thereof,

It is ordered that Robert W. Speer as Mayor of the city and county of Denver, W. F. R. Mills as Manager of Improvements and Parks of the city and county of Denver; Clair J. Pitcher as Manager of Revenue of the city and county of Denver; William H. Sharpley as Manager of Health and Charity of the city and county of Denver; Dewey C. Bailey, as Manager of Safety and Excise of the city and county of Denver; Charles A. Lammers as clerk and recorder of the city and county of Denver; Louis F. Bartels, J. A. Burnett, John Conlon, W. C. Danks, D. J. Monaghan, J. B. Rycraft, Thomas O. Spacy, Jesse M. Wheelock and Harry Zimmerhackel, as members of and constituting the Council of the city and county of Denver; and Armour C. Anderson, as sole member of and constituting the Public Utilities Commission of the city and county of Denver, be, and they are hereby substituted for and in lieu of the defendants, William H. Sharpley, Clair J. Pitcher, Alexander Nisbet, John B. Hunter and Lewis C. Greenlee, as commissioners, members of and constituting the council of the city and county of Denver, William H. Sharpley as mayor and commissioner of Social Welfare of the city and county

of Denver; Clair J. Pitcher, as commissioner of Finance of the
1476 city and county of Denver; Alexander Nisbet as commissioner of Safety of the city and county of Denver; John B. Hunter, as commissioner of Improvements of the city and county of Denver, Lewis C. Greenlee as Commissioner of Property of the city and county of Denver; and Armour C. Anderson and A. Lincoln Fellows as members of and constituting the Public Utilities Commission of the city and county of Denver.

UNITED STATES OF AMERICA,
District of Colorado, ss:

In the District Court of the United States for the District of Colorado.

In Equity.

No. 6274.

THE DENVER UNION WATER COMPANY, a Corporation, Complainant.
vs.
CITY and COUNTY OF DENVER, ROBERT W. SPEER, as Mayor of the City and County of Denver, W. F. R. Mills as Manager of Improvements and Parks of the City and County of Denver, Clair J. Pitcher as Manager of Revenue of the City and County of Denver, William H. Sharpley as Manager of Health and Charity of the City and County of Denver, Dewey C. Bailey as Manager of Safety and Excise of the City and County of Denver, James F. Markey as Auditor of the City and County of Denver, Charles A. Lammers as Clerk and Recorder of the City and County of Denver; Louis F. Bartels, J. A. Burnett, John Conlon, W. C. Danks, D. J.
1477 Monaghan, J. B. Rycraft, Thomas O. Spacy, Jesse M. Wheelock and Harry Zimmerhackel, as Members of and Constituting the Council of the City and County of Denver; and Armour C. Anderson as sole member of and constituting the Public Utilities Commission of the City and County of Denver, Defendants.

Assignment of Errors.

Now come the defendants in the above entitled cause, and file the following assignment of errors upon which they will rely upon their prosecution of the appeal in the above entitled cause from the decree made by this Honorable Court on the 1st day of February, A. D. 1916.

I.

That the United States District Court for the district of Colorado erred in approving and confirming in and by said decree, the report filed in said cause October 7th, 1915, of the Special Master, and erred in approving and confirming in and by said decree each and every part of said report.

II.

That the United States District Court for the district of Colorado erred in approving and confirming paragraph or finding No. 4 of said report of the Special Master filed in said cause October 7th, 1915; and that the said Special Master erred in making the said finding in said paragraph No. 4, because the said Special Master discloses that one of the questions determined by him was "the reason-
1478 able value of the property used by the Water Company in delivering water to the City and its inhabitants" and that in his said report as a whole he undertakes to and does find and return the figures by him determined to be the figures of reasonable value of the property used by the complainant company in delivering water to the City and its inhabitants; whereas the said Master ought to have found and determined the reasonable value only of the property used and useful in delivering water to the City and County and its inhabitants, and should have excluded the value of all property used which was not found by him useful and necessary to be used in so delivering water to the city and county and its inhabitants.

III.

That the United States District Court for the district of Colorado, erred in approving and confirming paragraph or finding No. 12 of said report of the Special Master filed in said cause October 7th, 1915; and that the said Special Master erred in making the said finding in said paragraph No. 12, because the said Special Master has in said report and in said paragraph or finding No. 12, and the table attached to said paragraph, stated and certified, and in the whole of said report has found, the reasonable value of the plant of the complainant company on May 1st, 1914, to be $13,415,-899.00, and in so finding has included the gross reproduction cost, including engineering and contingencies, less accrued depreciation, at the present reasonable value of said plant and property;
1479 whereas the Master ought to have used the fair contract cost new of the said property and plant; instead of the gross reproduction cost, less accrued depreciation, in determining the present reasonable value of the property of the complainant Company used and useful in supplying the city and county of Denver and its inhabitants with water, for that present reasonable value cannot in any event exceed the fair contract cost new of the property used in supplying the city and county of Denver and its inhabitants with water.

IV.

That The United States District Court for the district of Colorado erred in approving and confirming paragraph or finding No. 14 of said report of the Special Master filed herein October 7, 1915; and that said Master erred in making said finding in said paragraph

No. 14, because in and by said finding the Special Master has included within the Class "A" items of the aforesaid Table No. 1, the item known as item No. 26, "Tail Race from West Denver Pumping Station, $10,731.00," and the item known as No. 27, "Lake Archer Lands, $208,306.00;" whereas the Special Master ought to have found that each of the said items was property not useful or necessary to be used by the complainant company in supplying to the city and county of Denver and its inhabitants; and therefore ought to have found that each of said items should not be included in fixing the valuation of the property of the complainant company for the purposes of this suit.

1480 V.

That the United States District Court for the district of Colorado erred in approving and confirming paragraph or finding No. 18 of said report of the Special Master filed herein October 7th, 1915, and that the said Special Master erred in making said finding in said paragraph No. 18, because he finds items No. 1, Class "A," (Exhibit "C' pages 111-115), known as Lake Cheesman Reservoir lands, also referred to in paragraph or finding No. 14 of the Master's report, as of the reasonable value of $160,000.00, basing his valuation upon the cost of said lands to the complainant company; whereas the Master ought to have found that said lands were of a value not exceeding $40,799.00, because the cost of said land, as indicated by the evidence, was not indicative of the value thereof, but was in truth and in fact merely the price paid by the complainant Company to one of its subsidiary or interested companies, and in effect a price paid to itself.

VI.

That the United States District Court for the district of Colorado erred in approving and confirming paragraph or finding No. 24 of said report of the Special Master filed herein October 7th, 1915, and that the said Special Master erred in making said finding in said paragraph No. 24, because he stated and certified therein that the complainant company owns the water rights claimed by it by original appropriation, being items Nos. 4, 5, 6, 7, 8, 9, 10 and 12 Exhibit "C," because of its diversion of waters under such
1481 appropriations from the natural streams of Colorado, used by it in supplying its consumers in the city and county of Denver, and because contracts between the Water Company and its private consumers have been simply permits or licenses upon which rates have been paid by the consumers; whereas the Master ought to have found that the city and county of Denver and its inhabitants as an entirety has been and is now the consumer of all water appropriated by means of said appropriations initiated by said complainant Company, and the owner of such water rights, and that for purposes of determining fair value for rate making purposes there should be taken into consideration only the cost of the structure and the cost of initiation of such appropriation.

VII.

That the United States District Court for the district of Colorado erred in approving and confirming paragraph or finding No. 27 of said report of the Special Master filed herein October 7th, 1915, and that the said Special Master erred in making said finding in said paragraph No. 27, because he stated and certified therein that item No. 4, in group 1 should be included; whereas the Master ought to have found that item No. 4 should have been in part excluded, because said item No. 4 includes a claimed appropriation, and was of 3.14 cubic feet of water per second of time in the non-irrigating season; whereas in truth and in fact there is no such thing as the non-irrigating season, and the said amount of water and the appropriation thereof, the right and title thereto, rests in others than the complainant Company, towit, in the Lehow Estate.

1482 VIII.

That the United States District Court for the district of Colorado erred in approving and confirming paragraph or finding No. 27 of said report of the special master filed herein October 7th, 1915, and that the said Special Master erred in making said finding in said paragraph No. 27, because he stated and certified that items 5 and 6, being the appropriations of predecessors of complainant Company described on page 16 of Exhibit "C," were of the value of $200,000.00, and has included said items and such valuation in his said findings and in his whole report; whereas the Master ought to have found that the ownership of said water rights is in the city and county of Denver and its inhabitants, and that in the determination of fair value for rate making purposes no value ought to be assigned to such water rights as if owned by the complainant Company.

IX.

That the United States District Court for the District of Colorado erred in approving and confirming paragraph or finding No. 27 of said report of the Special Master filed herein October 7th, 1915; and that the said Special Master erred in making said finding in said paragraph No. 27, because he stated and certified that item 7, the Cherry Creek Galleries, being the appropriation of predecessors of complainant Company described on page 16 of Exhibit "C," was of the value of $66,000.00, and has included said item and such valuation in his findings and in his whole report; whereas the Master ought to have found that the ownership of said water rights is
1483 in the city and county of Denver and its inhabitants, and that in the determination of fair value for rate making purposes no value ought to be assigned to such water rights as if owned by the complainant Company.

X.

That the United States District Court for the district of Colorado erred in approving and confirming paragraph or finding No. 27 of said report of the Special Master filed herein October 7th, 1915; and that the Special Master erred in making said finding in said paragraph No. 27, because he stated and certified that item 8, the Platte Canon Filter Galleries, being the appropriation of predecessors of complainant Company described on page 16 of Exhibit "C" was of a value of $65,000.00, and has included said item and such valuation in his findings and in his whole report; whereas the Master ought to have found that the ownership of said water rights is in the city and county of Denver and its inhabitants, and that in the determination of fair value for rate making purposes no value ought to be assigned to such water rights as if owned by the complainant Company.

XI.

That the United States District Court of the district of Colorado erred in approving and confirming paragraph or finding No. 27 of said report of the Special Master filed herein October 7th, 1915; and that the said Special Master erred in making said finding in said paragraph No. 27, because he stated and certified that item 9, Platte Canon 34 inch conduit, being the appropriation of
1484 predecessors of complainant Company described on page 16 of Exhibit "C," was of a value of $24,750.00, and has included said item in such valuation in his said findings and in his whole report; whereas the Master ought to have found that the ownership of said water rights is in the city and county of Denver and its inhabitants, and that in the determination of fair value for rate making purposes no value ought to be assigned to such water rights as if owned by the complainant company.

XII.

That the United States District Court for the District of Colorado erred in approving and confirming paragraph or finding No. 27 of said report of the Special Master filed herein October 7th, 1915; and that the said Special Master erred in making said finding in said paragraph No. 27, because he stated and certified that item 10, Platte Canon 40 inch conduit, being the appropriation of predecessors of complainant Company, described on page 16 of Exhibit "C," was of a value of $30,000.00, and has included said item in such valuation in his said findings and in his whole report; whereas the Master ought to have found that the ownership of said water rights is in the city and county of Denver and its inhabitants, and that in the determination of fair value for rate making purposes no value ought to be assigned to such water rights as if owned by the complainant Company.

XIII.

That the United States District Court for the district of
1485 Colorado in approving and confirming paragraph or finding No. 27 of said report of the Special Master filed herein October 7th, 1915; and that the said Special Master erred in making said finding in said paragraph No. 27, because he stated and certified that item 12, Lake Cheesman, being the appropriation of predecessors of complainant Company described on page 16 of Exhibit "C," was of a value of $1,611,117.00, and has included said item in such valuation in his said findings and in his whole report; whereas the Master ought to have found that the ownership of said water rights is in the city and county of Denver and its inhabitants, and that in the determination of fair value for rate making purposes no value ought to be assigned to such water rights as if owned by the complainant Company. And for the further reason that the appropriation of said right, made by the Denver Union Water Company, complainant herein, was expressly made for the use and benefit of the city and county of Denver and its inhabitants; and upon the representations made by said complainant Company, that its appropriations were for the benefit of said city and county and its inhabitants, and for no other purpose, the said complainant Company acquired valuable rights, privileges and concessions, and is estopped to deny ownership by the said city and county and its inhabitants of the water so appropriated for the benefit of said city and county and its inhabitants.

XIV.

That the United States district court for the district of Colorado erred in approving and confirming paragraph or finding No.
1486 28 of said report of the Special Master filed herein October 7th, 1915; and that the said Special Master erred in making said finding in said paragraph 28, because he found and determined that the unit price of $55.00 per acre foot should be applied in determining the value of the water rights of complainant Company, and particularly applied to the so-called Lake Cheesman rights and to the estimated volume of water yielded by the water rights included on Group 1 of Class "B" (Exhibit "C" pages 117-118); whereas the Master ought to have found that a unit price of not to exceed $40.00 per acre foot should be used in determining the value of the water rights of the complainant Company actually owned by it, by applying such unit price of $40.00 per acre foot to the volume of water yielded by such rights, and ought not to have applied any such unit price to the volume of water yielded by those rights, ownership to which exists in the city and county of Denver and its inhabitants.

XV.

That the United States District Court for the district of Colorado erred in approving and confirming paragraph or finding No. 29 of

said report of the Special Master filed herein October 7th, 1916; and that the said Special Master erred in making said finding in said paragraph No. 29, because he applied the unit price of $55.00 per acre foot to an estimate yield of 54,000 acre feet of such volume of water to be $2,970,000.00, and, after deducting the value of Lake Cheesman structures, previously found by him, finds a net
1487 value of Lake Cheesman water rights to be $1,611,117.00, which value he has assigned as their present value; whereas the Master ought to have found that the ownership of the water appropriated through the Lake Cheesman structure, and the appropriations therefor, is in the city and county of Denver and its inhabitants, and that the value thereof should be excluded from consideration in determining the fair value of complainant Company's property for rate making purposes.

XVI.

That the United States district court for the district of Colorado erred in approving and confirming paragraph or finding No. 30 of said report, of the Special Master filed herein October 7th, 1915; and that the said Special Master erred in making said finding in said paragraph No. 30, because he stated and certified that he has applied the unit price of $55.00 per acre foot to the estimated yield of the water rights in Group 1 (Class "B", Water Rights Exhibit "C"); whereas the Master ought to have found that the unit price to be applied to the volume of yield of such rights should not in any event exceed the sum of $40.00 per acre foot, and that the estimated yield should not have exceeded 20,000 acre feet.

XVII.

That the United States District Court for the district of Colorado erred in approving and confirming paragraph or finding No. 41 of said report of the Special Master filed herein October 7th, 1915; and that the said Special Master erred in making said finding
1488 in paragraph No. 41, because he stated and certified that $805,000.00 should be allowed for interest during construction as reasonable and fair; whereas the Master ought to have found that no allowance whatever should be made for interest during construction in determining the present fair value of complainant's property for rate making purposes, if there is to be allowed also the item of "Going Concern" value, and because the plant of complainant company was not constructed as a new and complete plant, in the construction of which interest during construction might be an item for consideration, but was a plant constructed piecemeal and from time to time, and, except, for a very inconsiderable portion thereof, has been constructed out of income and with money derived through the payment of water rates in advance.

XVIII.

That the United States District Court for the district of Colorado erred in approving and confirming paragraph or finding No. 46 of said report of the Special Master filed herein October 7th, 1915; and that the said Special Master erred in making said finding in said paragraph No. 46, because he stated and certified that $800,000.00 is a sum reasonable and fair to be allowed as the intangible element of "Going Concern Value" and proper to be included in the fair value of complainant's property for rate making purposes; whereas the Master ought to have found that, having previously fully allowed the item of interest during construction and
1489 engineering and contingencies, which items go to make up the principal portion of overhead charges, there should be nothing further allowed for "Going Concern Value", and further, should have found that in appraising the property of complainant Company at reproduction cost less accrued depreciation, including engineering, contingencies and interest during construction, the property had been appraised as an established and assembled plant, doing business and earning money, and that the intangible element of so-called "Going Concern Value" ought not thereafter to have been added, and ought not to be included in the determination of the present fair value of complainant's property for rate making purposes.

XIX.

That the United States District Court for the district of Colorado erred in approving and confirming the report of said Special Master and his allowance of valuations; and the said Special Master erred in making said report and findings and in his allowance of valuations therein, by duplicating certain values (as particularly appears from Table 1 of paragraph 12 of the report), in that he has included in the "Gross Reproduction Cost" an allowance of "12½% for Engineering and Contingencies", and an allowance of $699,545.00 for "Interest During Construction", and an allowance of $800,000.00 for "Going Concern Value"; whereas the said allowance of "12½% for Engineering and Contingencies", and the allowance of $699,545.00 for "Interest During Construction", are what are commonly known as overhead charges and go to make up the item of "Going Concern Value".

1490 XX.

That the United States District Court for the district of Colorado erred in approving and confirming the report of the said Special Master; and the Special Master erred in his finding in said report and making as great an allowance as $800,000.00, or any allowance at all for "Going Concern Value", (paragraphs 12 and 46 of the Master's Report), because, as appears by the uncontradicted evi-

dence in the case, the franchise of the complainant company has expired, and the complainant company had not on May 1st, 1914, and has not since, and has not now, any franchise to do business in the city and county of Denver.

XXI.

That the United States district court for the district of Colorado erred in approving and confirming the report of said Special Master; and the Special Master erred in his findings in said report because the Special Master has, throughout his entire report, attached undue weight and importance to the testimony of the witnesses Metcalf and Anderson, who were witnesses for the complainant, and has as the result thereof placed excessive values upon much of the property of the complainant company.

XXII.

That the United States district court for the district of Colorado erred in approving and confirming paragraph or finding No. 50 of said report of said Special Master filed herein October 7th, 1915; and that the said Special Master erred in making said finding
1491 in said paragraph No. 50, because he stated and certified that $140,000.00 is allowed for "Annual Depreciation," whereas the Master ought to have found that nothing should be allowed for "Annual Depreciation" as the same is included annually in the item of "Operating Expenses."

XXIII.

That the United States District Court for the district of Colorado erred in approving and confirming paragraph or findings Nos. 8 and 53 of said report of said Special Master filed herein October 7th, 1915; and that the said Special Master erred in making and finding in said paragraphs Nos. 8 and 53, because he found, stated and certified that the rate making ordinance, being Ordinance No. 26 of the Series of 1914, does not permit the Water Company to earn for the use of its property such compensation as is fair to it and to the City, and that the enforcement of said ordinance will result in the taking of the use of said property without just compensation and the said ordinance is invalid; whereas the Master ought to have found that said ordinance did permit the complainant Company to earn for the use of its property such compensation as is fair to it and to the City, and that the enforcement of said ordinance will not result in the taking of said property without just compensation, and that the same is valid.

XXIV.

That the United States District Court for the district of
1492 Colorado erred in overruling the exceptions of the respective

parties defendant to the report of the Special Master filed herein October 7th, 1915.

XXV.

That the United States District Court for the district of Colorado erred in changing the word "overruled" to the word "stricken" in the order of January 28th, 1916, by order and decree entered herein on the 1st day of February 1916.

XXVI.

That the United States District Court for the district of Colorado erred in making and entering the order in said cause of January 28th, 1916, that the exceptions of the parties defendant to the report of the special master filed herein October 7th, 1915, be stricken and for naught held.

XXVII.

That the United States District Court for the district of Colorado erred in making and entering the order in said cause of January 28th, 1916, that the report of the Special Master, W. J. Chinn, Esq., filed October 7th, 1915, be and is in all things confirmed, and that the cause pass to final decree for complainant in accordance with the findings and recommendations of the said Special Master.

XXVIII.

That the United States District Court for the district of Colorado erred in making and entering the order in said cause of
1493 January 28th, 1916, overruling the exceptions of the parties defendant to the report of said Special Master filed October 7th, 1915; and ordering and directing that the exceptions of the respective parties defendant to said report be stricken and for naught held, and that the report of said Special Master, W. J. Chinn, Esq., be and is in all things confirmed, and that the cause pass to final decree for complainant in accordance with the findings and recommendations of said Special Master.

XXIX.

That the United States District Court for the district of Colorado erred in making and entering the order of February 1st, 1916, in said cause, that the petition and each and every part thereof, filed herein February 1st, 1916, on behalf of defendants and each of them, asking that the order of May 21st, 1914, appointing the Special Master in said cause be modified and corrected by adding thereto after the word "consenting" in line 6 of said order the following: "to the individual selected as Special Master" be denied.

XXX.

That the United States District Court for the district of Colorado erred in making and entering the order of February 1st, 1916 in said cause, that the petition and each and every part thereof, filed herein February 1st, 1916, on behalf of defendants and each of them, asking that the defendants be permitted to file their objections and exceptions to the findings and conclusions of the Master be-
1494 fore the Master, and to direct that such objections and exceptions be passed upon by the Master, be denied.

XXXI.

That the United States District Court for the District of Colorado erred in making and entering the order of February 1st, 1916 in said cause, that the petition and each and every part thereof, filed herein February 1st, 1916, on behalf of defendants and each of them, praying the court to modify the order entered on January 28th, 1916, in said cause, directing "that the exceptions of the respective parties to said report be stricken and for naught held," by causing the same to read, "that the exceptions of the respective parties to said report be and the same are overruled," be denied.

Wherefore, defendants and appellants pray that said decree be reversed, and that said District Court for the said district of Colorado be ordered to enter a decree reversing the decree of the lower court in said cause.

J. A. MARSH,
F. W. SANBORN,
Solicitors for Defendants and Appellants.

(Endorsed:) No. 6274. United States District Court. The Denver Union Water Co., Complainant, vs. City and County of Denver, et al, Defendants. Assignment of Errors. Filed Jul. 29, 1916, Charles W. Bishop, Clerk.

1495 UNITED STATES OF AMERICA,
District of Colorado, ss.:

In the District Court of the United States for the District of Colorado.

In Equity.

No. 6274.

THE DENVER UNION WATER COMPANY, a Corporation, Complainant,
vs.
CITY AND COUNTY OF DENVER, ROBERT W. SPEER as Mayor of the City and County of Denver, W. F. R. Mills as Manager of Improvements and Parks of the city and county of Denver, Clair J. Pitcher as Manager of Revenue of the city and county of Denver, William H. Sharpley as Manager of Health and Charity of the

city and county of Denver, Dewey C. Bailey as Manager of Saftey and Excise of the city and county of Denver, James F. Markey as Auditor of the city and county of Denver, Charles A. Lammers as clerk and recorder of the city and county of Denver, Louis F. Bartels, J. A. Burnett, John Conlon, W. C. Danks, D. J. Monaghan, J. B. Ryeraft, Thomas O. Spacy, Jesse M. Wheelock and Harry Zimmerhackel, as members of and constituting the council of the city and county of Denver, and Armour C. Anderson as sole member of and constituting the Public Utilities Com-
1496 mission of the city and county of Denver, Defendants.

Petition for Appeal.

To the Honorable Robert E. Lewis, District Judge:

The above named defendants, and each of them, feeling aggrieved by the decree rendered and entered in the above entitled cause on the 1st day of February, A. D. 1916, do hereby appeal from said decree to the Supreme Court of the United States, for the reasons set forth in the assignment of errors filed herewith; and they, and each of them, pray that their appeal be allowed, and that citation be issued as provided by law, and that a transcript of the record proceedings and documents upon which said decree was based, duly authenticated, be sent to the Supreme Court of the United States, sitting at Washington, D. C., under the rules of such court in such cases made and provided.

And your petitioners, and each of them, further pray that the proper order relating to the required security to be required of them be made.

J. A. MARSH,
F. W. SANBORN,
Solicitors for Defendants.

Appeal allowed upon giving bond as required by law in the sum of $500.

ROBERT E. LEWIS, *Judge.*

1497 (Endorsed:) No. 6274. United States District Court. The Denver Union Water Co., Complainant vs. City and County of Denver, et al, Defendants. Petition for Appeal. Filed Jul. 29, 1916, Charles W. Bishop, Clerk.

SATURDAY, July 29th, A. D. 1916.

At Chambers, before the Honorable Robert E. Lewis, district judge, the following proceedings were had:

In Equity.

6274.

THE DENVER UNION WATER COMPANY

vs.

THE CITY AND COUNTY OF DENVER, ROBERT W. SPEER as mayor of the city and county of Denver, W. F. R. Mills as Manager of Improvements and Parks of the city and county of Denver, Clair J. Pitcher as Manager of Revenue of the city and county of Denver, William H. Sharpley as Manager of Health and Charity of the city and county of Denver, Dewey C. Bailey as Manager of Safety and Excise of the city and county of Denver; Charles A. Lammers as clerk and recorder of the city and county of Denver, Louis F. Bartels, J. A. Burnett, John Conlon, W. C. Danks, D. J. Monaghan, J. B. Rycraft, Thomas O. Spacy, Jesse M. Wheelock and Harry Zimmerhackel, as members of and constituting the council of the city and county of Denver, and Armour C. Anderson, as sole member of and constituting the Public Utilities
1498 Commission of the city and county of Denver.

Bill for Injunction and for Other Relief.

This cause comes on now to be heard, James A. Marsh, Esquire, appearing as solicitor for the defendants. And thereupon, the defendants pray an appeal to the Supreme Court of the United States which is hereby allowed to them, but upon the consideration nevertheless that they give bond on such appeal in the sum of five hundred dollars ($500.00).

UNITED STATES OF AMERICA,
District of Colorado, ss:

In the District Court of the United States for the District of Colorado.

No. 6274. In Equity.

THE DENVER UNION WATER COMPANY, a Corporation, Complainant,

vs.

CITY AND COUNTY OF DENVER, ROBERT W. SPEAR, as Mayor of the City and County of Denver; W. F. R. Mills, as Manager of Improvements and Parks of the City and County of Denver; Clair J. Pitcher, as Manager of Revenue of the City and County of Denver; William H. Sharpley, as Manager of Health and Charity of the City and County of Denver; Dewey C. Bailey, as Manager of Safety and Excise of the City and County of Denver; James F. Markey as Auditor of the City and County of Denver; Charles A.

Lammers as Clerk and Recorder of the City and County
1499 of Denver; Louis F. Bartels, J. A. Burnett, John Conlon, W. C. Danks, D. J. Monaghan, J. B. Ryeraft, Thomas O. Spacy, Jesse M. Wheelock and Harry Zimmerhackel, as Members of and Constituting the Council of the City and County of Denver; and Armour C. Anderson, as Sole Member of and Constituting the Public Utilities Commission of the City and County of Denver, Defendants.

Bond on Appeal.

Know all men by these presents, That we, City and County of Denver, a municipal corporation, Robert W. Speer as mayor of the city and county of Denver, W. F. R. Mills as Manager of Improvements and Parks of the city and county of Denver, Clair J. Pitcher as Manager of Revenue of the city and county of Denver, William H. Sharpley as Manager of Health and Charity of the city and county of Denver, Dewey C. Bailey as Manager of Safety and Excise of the city and county of Denver, James F. Markey as auditor of the city and county of Denver, Charles A. Lammers as clerk and recorder of the city and county of Denver; Louis F. Bartels, J. A. Burnett, John Conlon, W. C. Danks, D. J. Monaghan, J. B. Ryeraft, Thomas O. Spacy, Jesse M. Wheelock and Harry Zimmerhackel, as members of and constituting the council of the city and county of Denver; and Armour C. Anderson as sole member of and constituting the Public Utilities Commission of the city and county
1500 of Denver, appellants in the above entitled cause, as principals, and *and* The Fidelity & Deposit Company of Maryland, a corporation of the state of Maryland, duly authorized to do business as a surety company in the state of Colorado, as surety, acknowledge ourselves to be jointly indebted to The Denver Union Water Company, a corporation, appellee in the above entitled cause, in the sum of five hundred dollars ($500.00), (as indicated by the judge allowing the appeal), conditioned that,

Whereas, on the 1st day of February, A. D. 1916, the district court of the United States for the district of Colorado in a suit depending in that court wherein The Denver Union Water Company, a corporation, was plaintiff, and the City and County of Denver, William H. Sharpley, Clair J. Pitcher, Alexander Nisbet, John B. Hunter, and Lewis C. Greenlee, as commissioners, members of and constituting the council of the city and county of Denver, William H. Sharpley as mayor and Commissioner of Social Welfare of the city and county of Denver, Clair J. Pitcher as Commissioner of Finance of the city and county of Denver, Alexander Nisbet as Commissioner of Safety of the city and county of Denver, John B. Hunter as Commissioner of Improvements of the city and county of Denver; Lewis C. Greenlee as Commissioner of Property of the city and county of Denver; James F. Markey as Auditor of the city and county of Denver; Armour C. Anderson and A. Lincoln Fellows, as members of and constituting the Public Utilities Commission of

the city and county of Denver, were defendants, (numbered on the Equity Docket as 6274), a decree was rendered against said defendants;

1501 And whereas, by order of court duly made and entered, the City and County of Denver, Robert W. Speer as Mayor of the city and county of Denver, W. F. R. Mills as Manager of Improvements and Parks of the city and county of Denver, Clair J. Pitcher as Manager of Revenue of the city and county of Denver, William H. Sharpley as Manager of Health and Charity of the city and county of Denver, Dewey C. Bailey as Manager of Safety and Excise of the city and county of Denver, James F. Markey as auditor of the city and county of Denver, Charles A. Lammers as clerk and recorder of the city and county of Denver; Louis F. Bartels, J. A. Burnett, John Conlon, W. C. Danks, D. J. Monaghan, J. B. Rycraft, Thomas O. Spacy, Jesse M. Wheelock and Harry Zimmerhackel, as members of and constituting the council of the city and county of Denver; and Armour C. Anderson as sole member of and constituting the Public Utilities Commission of the city and county of Denver, were substituted for and in lieu of the defendants named in the next preceding paragraph hereof;

And whereas, said last named defendants have obtained an appeal to the Supreme Court of the United States, and a citation directed to said The Denver Union Water Company, complainant, citing and admonishing it to be and appear in the Supreme Court of the United States at the city of Washington, D. C. on the 28 day of August, A. D. 1916;

Now, therefore, if the said City and County of Denver and the other last named defendants and appellants, shall prosecute
1502 their said appeal with effect, and answer all costs if they fail to make their plea good, then the above obligation to be void; else to remain in full force and virtue.

Signed, sealed and delivered this 29th day of July, A. D. 1916.

CITY AND COUNTY OF DENVER,
By R. W. SPEER, *Mayor.*

Attest:

[Clerk and Recorder's Seal.]

CHARLES A. LAMMERS,
Clerk and Recorder of the City and County of Denver.

R. W. SPEER,
As Mayor of the City and County of Denver,
W. F. R. MILLS,
By FRED LOCKWOOD, *Sec.,*
As Manager of Improvements and Parks of the City and County of Denver;
CLAIR J. PITCHER,
As Manager of Revenue of the City and County of Denver;

WILLIAM H. SHARPLEY,
As Manager of Health and Charity of the City and County of Denver;
D. C. BAILEY,
As Manager of Safety and Excise of the City and County of Denver;
J. F. MARKEY,
As Auditor of the City and County of Denver;
1503 CHARLES A. LAMMERS,
As Clerk and Recorder of the City and County of Denver;
L. F. BARTELS,
J. A. BURNETT,
JOHN CONLON,
W. C. DANKS,
D. J. MONAGHAN,
J. B. RYCRAFT,
THOS. O. SPACY,
JESSE M. WHEELOCK,
HARRY ZIMMERHACKEL,
As Members of and Constituting the Council of the City and County of Denver;
ARMOUR C. ANDERSON,
As Member of and Constituting the Public Utilities Commission of the City and County of Denver;
Principals,

[CORPORATE SEAL.] THE FIDELITY & DEPOSIT COMPANY OF MARYLAND,
By FRANK L. BISHOP,
Attorney-in-Fact.

Attest:
HERBERT W. ROBINSON, *Agent,*
Surety.

Approved as to form:
J. A. MARSH,
Attorney for City and County of Denver.

Approved this 29th day of July, A. D. 1916.
ROBT. E. LEWIS, *Judge.*

1504 *Power of Attorney.*

Fidelity and Deposit Company of Maryland.

Home Office: Baltimore, Maryland.

Know All Men by These Presents: That the Fidelity and Deposit Company of Maryland, by Fred S. Axtell, its vice-president, and Wm. R. Bishop its assistant secretary, in pursuance of authority

granted by Section 3, Article VI, of the By-Laws of said Company, a copy of which section is hereto attached, does hereby nominate, constitute and appoint Frank L. Bishop, M. E. Minty, Sidney Moritz, Herbert W. Robinson, William G. Maitland, L. Ward Bannister, and Leroy McWhinney, all of the city of Denver, state of Colorado, its true and lawful agents, and attorneys-in-fact, to make, execute, seal and deliver for and on its behalf, as surety, and as its act and deed, any and all bonds or undertakings required in the states of Colorado, Wyoming and New Mexico.

Such bonds or undertakings to be executed for the Company by any two of said Frank L. Bishop, M. E. Minty, Sidney Moritz, Herbert W. Robinson, William G. Maitland, L. Ward Bannister and Leroy McWhinney, one signing the Company's name per his, as attorney-in-fact, and the other attesting as agent and affixing the seal of the Company.

And the execution of such bonds or undertakings in pursuance of these presents, shall be as binding upon said Company, as fully and amply, to all intents and purposes, as if they had been duly
1505 executed and acknowledged by the regularly elected officers of the Company at its office in Baltimore, Maryland, in their own proper persons. This power of attorney revokes those of October 20th, 1910, June 14th, 1912 and March 11th, 1913, in behalf of E. S. Kassler, et al.

In Witness Whereof, the said Fred S. Axtell, vice-president and Wm. R. Bishop, assistant secretary, have hereunto subscribed their names and affixed the corporate seal of the said Fidelity and Deposit Company of Maryland, this 12th day of May, 1913.

[CORPORATE SEAL.] FRED S. AXTELL,
Vice-President.

Attest:
W. R. BISHOP,
Assistant Secretary.

STATE OF MARYLAND,
City of Baltimore, ss:

On this 12th day of May, A. D. 1913, before the subscriber, a notary public of the state of Maryland, in and for the city of Baltimore, duly commissioned and qualified, came Fred S. Axtell, Vice President and Wm. R. Bishop, Assistant Secretary, of the Fidelity and Deposit Company of Maryland, to me personally known to be the individuals and officers described in, and who executed the preceding instrument, and, they each acknowledged the execution of the same, and being by me duly sworn, severally and each for himself deposeth and saith, that they are the said officers of the Company aforesaid, and that the seal affixed to the preceding instrument is the corporate seal of said Company, and that the said corporate
1506 seal and their signature as acknowledged by the regularly elected officers of the Company at its office in Baltimore, Maryland, in their own proper persons. This power of attorney

revokes those of October 20th, 1910, June 14th, 1912 and March 11th, 1913, in behalf of E. S. Kassler, et al.

In Witness Whereof, the said Fred S. Axtell, vice-president and Wm. R. Bishop, assistant secretary, have hereunto subscribed their names and affixed the corporate seal of the said Fidelity and Deposit Company of Maryland, this 12th day of May, 1913.

[CORPORATE SEAL.] FRED S. AXTELL,
Vice-President.

Attest:
W. R. BISHOP,
Assistant Secretary.

STATE OF MARYLAND,
City of Baltimore, ss:

On this 12th day of May, A. D. 1913, before the subscriber, a notary public of the state of Maryland, in and for the city of Baltimore, duly commissioned and qualified, came Fred S. Axtell, Vice President and Wm. R. Bishop, Assistant Secretary, of the Fidelity and Deposit Company of Maryland, to me personally known to be the individuals and officers described in, and who executed the preceding instrument, and they each acknowledged the execution of the same, and being by me duly sworn, severally and each for himself deposeth and saith, that they are the said officers of the Company aforesaid, and that the seal affixed to the preceding instrument is the corporate seal of said Company, and that the said corporate seal and
1507 their signature as such officers were duly affixed and subscribed to the said instrument by the authority and direction of the said corporation.

In Testimony Whereof, I have hereunto set my hand and affixed my official seal, at the city of Baltimore, the day and year first above written.

[NOTARIAL SEAL.] MILLARD LEONARD,
Notary Public.

Commission expires May 4, 1914.

Extracts from By-Laws of the Fidelity and Deposit Company of Maryland, Adopted by the Stockholders of Said Company on January 14th, 1913.

"Article VI, Section 3—The president, or any of the vice-presidents, elected by ballot from the members of the board of directors shall have power by and with the concurrence of the secretary or any of the assistant secretaries, to appoint any attorney-in-fact or to authorize any person or persons to execute on behalf of the Company, any bonds, recognizances, stipulations, undertakings, deeds, releases of mortgages, contracts, agreements and policies, and to affix the seal of the Company thereto."

I, Wm. R. Bishop, assistant secretary of the Fidelity and Deposit Company of Maryland, hereby certify that the aforegoing is a true

copy of Section 3, Article VI, of the By-Laws of said Company and is still in force.

In Testimony Whereof, I have hereunto subscribed my name as assistant secretary, and affixed the corporate seal of the Fidelity and Deposit Company of Maryland, this 12th day of May, A. D. 1913.

[CORPORATE SEAL.] W. R. BISHOP,
Assistant Secretary.

Fidelity and Deposit Company of Maryland.

Incorporated February, 1890.

1508 General Offices: Baltimore.

Financial Statement. March 31st, 1916.

Assets.

Home office building and annex	$2,600,000.00
Other real estate	64,021.86
Bonds and stocks	6,173,208.13
First mortgage loans, etc	328,762.39
Unpaid premiums (subsequent to Dec. 31, 1915)	1,418,013.78
Unpaid premiums (prior to Dec. 31, 1915)	599,924.25
Bank deposits for use of branch offices, etc	79,649.48
Cash in banks and trust companies	1,184,874.11
Total assets	12,448,454.00

(Assets deducted according to ruling and regulations of various insurance departments, etc.)

Unpaid premiums (prior to Dec. 31, 1915)	$599,924.25	
Net amount of special deposits made under laws of various states, etc	326,687.15	
		926,611.40
Total Assets (on basis of statement to insurance departments, etc.)		11,521,842.60

Liabilities.

Reserve for unearned premiums	$3,215,739.51
Reserve for claims, admitted & unadmitted	2,163,612.76
Reserve for advance premuims and return premiums	284,230.42
Reserve for commissions (unpaid premiums subsequent to Dec. 31st, 1915)	248,300.35
Reserve for premium taxes, and expenses in transit	112,845.89
Reserves, special and contingent	409,601.75

Reserve for unpaid reinsurance premiums			81,895.89
Capital stock		$3,000,000.00	
Surplus and undivided profits	$2,932,227.43		
Less amount deducted according to insurance department regulations, (see above)	926,611.40		
Surplus and undivided profits (on basis of statement to insurance departments, etc.)		2,005,616.03	
			5,005,616.03
			11,521,842.60

STATE OF MARYLAND,
City of Baltimore, sct:

I, Thos. L. Berry, asst. treasurer of the Fidelity and Deposit Company of Maryland, do hereby certify that the above is a true statement of the assets and liabilities of said Company, as of March 31st, 1916, taken from the books and records of said Company.

THOS. L. BERRY,
Ass't Treasurer.

STATE OF MARYLAND,
City of Baltimore, sct:

Subscribed and sworn to before me, a notary public of the state of Maryland, in the city of Baltimore, this 26th of April, A. D. —.

——— ———.

1509 General Office: Baltimore.

Financial Statement. March 31st, 1916.

Assets.

Home office building and annex	$2,600,000.00
Other real estate	64,021.86
Bonds and stocks	6,173,208.13
First mortgage loans, etc	328,762.39
Unpaid premiums (subsequent to Dec. 31, 1915)	1,418,013.78
Unpaid premiums (prior to Dec. 31, 1915)	599,924.25
Bank deposits for use of branch offices, etc	79,649.48
Cash in banks and trust companies	1,184,874.11
Total assets	12,448,454.00

(Assets deducted according to ruling and regulations of various insurance departments, etc.)

Unpaid premiums (prior to Dec. 31, 1915)	$599,924.25	
Net amount of special deposits made under laws of various states, etc...	326,687.15	
		926,611.40
Total Assets (on basis of statement to insurance departments, etc.)		11,521,842.60

Liabilities.

Reserve for unearned premiums		$3,215,739.51
Reserve for claims, admitted & unadmitted		2,163,612.76
Reserve for advance premiums and return premiums		284,230.42
Reserve for commissions (unpaid premiums subsequent to Dec. 31st, 1915)		248,300.35
Reserve for premium taxes, and expenses in transit		112,845.89
Reserves, special and contingent		409,601.75
Reserve for unpaid reinsurance premiums		81,895.89
Capital stock	$3,000,000.00	
Surplus and undivided profits	$2,932,227.43	
Less amount deducted according to insurance department regulations, (see above)	926,611.40	
Surplus and undivided profits (on basis of statement to insurance departments, etc.)	2,005,616.03	
		5,005,616.03
		11,521,842.60

STATE OF MARYLAND,
City of Baltimore, sct:

I, Thos. L. Berry, ass't treasurer of the Fidelity and Deposit Company of Maryland, do hereby certify that the above is a true statement of the assets and liabilities of said company, as of March 31st, 1916, taken from the books and records of said Company.

THOS. L. BERRY,
Ass't Treasurer.

STATE OF MARYLAND,
City of Baltimore, sct:

Subscribed and sworn to, before me, a notary public of the State of Maryland, in the city of Baltimore, this 26th of April, 1510 A. D. 1916.

[NOTARIAL SEAL.]

WM. A. BULLOCK,
Notary Public.

(Endorsed:) No. 6274. United States District Court. The Denver Union Water Co., Complainant, vs. City and County of Denver, et al., Defendants. Defendants' Appeal Bond $500.00. Filed Jul-29, 1916. Charles W. Bishop, Clerk.

1511 In the District Court of the United States for the District of Colorado.

In Equity. No. 6274.

THE DENVER UNION WATER COMPANY, a Corporation, Plaintiff,

vs.

CITY AND COUNTY OF DENVER, ROBERT W. SPEER as Mayor of the City and County of Denver; W. F. R. Mills, as Manager of Improvements and Parks of the City and County of Denver; Clair J. Pitcher, as Manager of Revenue of the City and County of Denver; William H. Sharpley, as Manager of Health and Charity of the City and County of Denver; Dewey C. Bailey, as Manager of Safety and Excise of the City and County of Denver; James F. Markey, as Auditor of the City and County of Denver; Charles A. Lammers, as Clerk and Recorder of the City and County of Denver; Louis F. Bartels, J. A. Burnett, John Conlon, W. C. Danks, D. J. Monaghan, J. B. Rycraft, Thomas O. Spacy, Jesse M. Wheelock and Harry Zimmerhackel, as members of and Constituting the Council of the City and County of Denver, and Armour C. Anderson as Sole Member of and Constituting the Public Utilities Commission of the City and County of Denver, Defendants.

Plaintiff's Assignment of Errors on Cross Appeal.

Now comes the plaintiff above named and says that, insofar as under the order of reference in this case the report of the Special Master is in law conclusive as to any matters therein con-
1512 tained, the plaintiff does not by filing this assignment of errors, or by praying or prosecuting an appeal based thereon, consent to the review of said matters by this court or by the Supreme Court on appeal, but plaintiff files and presents this assignment of errors as a basis for its cross appeal, and will take and prosecute such cross appeal subject to such rulings as the court may make concerning the right and duty of the court to review such matters, said errors so assigned to be urged by the plaintiff and cross appellant with respect only to such findings and conclusions as the court may determine are so subject to review, and without waiver of or prejudice to all or any of plaintiff's rights or contentions in the premises.

With the foregoing reservation, plaintiff, as cross appellant, files and presents this its assignment of errors, as a basis for its cross appeal, and respectfully represents that in the records and proceedings of said district court in the above entitled cause, and also in the proceedings before the Special Master to whom said cause was

referred, and in the findings and report of said special master, there is manifest error, which error, in the event, and only in the event, that the Supreme Court should upon the appeal taken herein by the defendants sustain the assignments of error, or some of them, filed herein by said defendants as the basis of their said appeal, would be highly prejudicial to the said plaintiff, in the following particulars, towit:

1. The Special Master erred in finding (his report, paragraph 11) that "The evidence shows no material change in the
1513 plant between this day and the time when the evidence was heard," and the district court erred in overruling plaintiff's exception I thereto and in confirming and adopting said finding.

2. The Special Master erred in finding (his report, paragraph 12, Table 1, and paragraph 48) the reasonable value of all of the property used by the plaintiff on May 1, 1914, and useful as a part of its water plant for the delivery of water to the city and its inhabitants, to be only the sum of $13,415,899.00, whereas the evidence shows, without substantial dispute, that said valuation should have been a much larger amount, and the district court erred in overruling plaintiff's exception II to said finding and in confirming and adopting the same.

3. The Special Master erred (his report, paragraph 14) in allowing for the Lake Cheesman lands (Exhibit C, Class A, Item 1) only the sum of $160,000.00, whereas the evidence shows, without substantial dispute, that said allowance should have been at least the sum of $200,000.00, and the district court erred in overruling plaintiff's exception III to said finding and in confirming and adopting said finding.

4. The Special Master erred (his report, paragraph 14) in allowing only the sum of $765.00 for the Platte River Stone Placer claim (Exhibit C, Class A, Item 2), whereas the evidence shows, without substantial dispute, that said allowance should have been at least the sum of $3,600.00, and the district court erred in over-
1514 ruling plaintiff's exception IV to said finding and in confirming and adopting said finding.

5. The Special Master erred (his report, paragraph 14) in allowing for the Platte Canon Valley lands (Exhibit C, Class A, Item 3) only the sum of $3,065.00, whereas the evidence shows without substantial dispute, that said allowance should have been at least the sum of $7,500.00, and the district court erred in overruling plaintiff's exception V to said finding, and in confirming and adopting said finding.

6. The Special Master erred (his report, paragraph 14) in allowing for the Platte Canon filter station (Exhibit C, Class A, Item 5) only the sum of $1,000.00, whereas the evidence shows, without substantial dispute, that said allowance should have been at least the sum of $5,350.00, and the district court erred in overruling plaintiff's exception VI to said finding, and in confirming and adopting said finding.

7. The Special Master erred (his report, paragraph 14) in allow-

ing for the Platte Canon power house site (Exhibit C, Class A Item 6) only the sum of $1,000.00 whereas the evidence shows without substantial dispute that said allowance should have been at least $2000.00, and the district court erred in overruling plaintiff's exception VII to said finding and in confirming and adopting said finding.

8. The Special Master erred (his report, paragraph 14
1515 in allowing for the Marston Lake reservoir site (Exhibit C, Class A, Item 17) only the sum of $125,000.00, whereas the evidence shows, without substantial dispute, that said allowance should have been at least the sum of $168,000.00, and the district court erred in overruling plaintiff's exception VIII to said finding, and in confirming and approving said finding.

9. The Special Master erred (his report, paragraph 14) in allowing for the Cherry Creek galleries site (Exhibit C, Class A, Item 20) only the sum of $4,370.00, whereas the evidence shows, without substantial dispute, that said allowance should have been at least the sum of $8,500.00, and the district court erred in overruling plaintiff's exception IX to said finding, and in confirming and adopting said finding.

10. The Special Master erred (his report, paragraph 15) in refusing to consider, in determining the present fair value of the lands, anything on account of the actual or estimated consequential or severance damages necessarily incurred in the acquisition thereof, and the district court erred in overruling plaintiff's exception X to said conclusion and finding, and in confirming and adopting said conclusion and finding.

11. The Special Master erred (his report, paragraph 15) in refusing to consider, in determining the present fair value of the lands, or to include therein, anything whatever on account of overhead expenses necessarily incurred in connection therewith, which the evidence shows, without substantial dispute, would re-
1516 quire an addition of at least ten per cent to the present actual market value for ordinary purposes, and the district court erred in overruling plaintiff's exception XI to said finding and conclusion, and in confirming and adopting said finding and conclusion.

12. The Special Master erred in ignoring and refusing to allow any additional value whatsoever on account of the special availability and adaptability for certain uses of the Lake Cheesman and Lake Marston lands and of the specific tracts of land mentioned in paragraph 17 of his report, and the district court erred in overruling plaintiff's exception XII to said finding and conclusion, and in confirming and adopting said finding and conclusion.

13. The Special Master erred (his report, paragraph 18) in allowing for the Lake Cheesman lands as the present value thereof only the purchase price paid therefor by the Water Company in the year 1899, instead of a much larger amount, as the evidence without substantial disputes, requires, and the district court erred in overruling plaintiff's exception XIII to said finding, and in confirming and adopting said finding.

14. The Special Master erred (his report, paragraph 19) in refusing to include in his valuation of the Marston Lake reservoir lands (Exhibit C, Class A, Item 17) anything whatever on account of their peculiar availability and adaptability, although the evidence shows, without substantial dispute, that for said reason they possess a value largely in excess of their market value for ordinary purposes which alone the Master allowed, and the district court erred in over-
1517 ruling plaintiff's exception XIV to said finding, and in confirming and adopting said finding.

15. The Special Master erred (his report, paragraph 21) in excluding from the property valued by him as a rating base the following items listed in Exhibit C, Class A, towit: Item 9, the Phœbe Strong Ranch, which should have been valued in the sum of at least $18,080.00; Item 10, the William Strong Ranch, which should have been valued in the sum of at least $15,000.00 (deducting filter site); Item 11, the Becky Archer Ranch, which should have been valued in the sum of at least $13,100.00; Item 12, the Frank Archer Ranch, which should have been valued in the sum of at least $37,900.00, although the evidence shows, without substantial dispute, that the retention and operation of said ranches is essential to the full protection and preservation of the water rights necessary for the supplying of the City and its inhabitants, and the District Court erred in overruling plaintiff's exception XV to said finding, and in confirming and adopting said finding.

16. The Special Master erred (his report, paragraph 21) in deducting from and not including in the property valued by him as a rating base the following items of real estate listed in Exhibit C, Class A, towit: Item 13, Mountain Reservoir site, which should have been valued in the sum of at least $6,075.00; Item 20-a, Woodbury land, which should have been valued in the sum of at least $1,500.00; Item 23, DeLappe Place, which should have been valued in
1518 the sum of at least $676.00; Item 24, Cottage Hill tank site, which should have been valued in the sum of at least $5,-208.00; Item 30, Office and Superintendent's Residence, which should have been valued in the sum of at least $3,250.00; Item 32, Lots in Cottage Hill, which should have been valued in the sum of at least $6,808.00, although the evidence shows without substantial dispute, that said items of property and each thereof, if not in actual use, were provided and held for use in the reasonably near future in connection with the waterworks system and as a part thereof, and the district court erred in overruling plaintiff's exception XVI to said finding, and in confirming and adopting said finding.

17. The Special Master erred (his report, paragraph 21) in excluding from and not including in the property valued by him as a rating base the following item of real estate, towit: Exhibit C, Class A, Item 15, Harriman Lake site, which should have been valued in the sum of at least $8,450.00, although the evidence shows, without dispute, that the same and the structure thereon are presently useful and actually used in connection with the water-works system, and fulfilling a necessary and valuable function in that regard, and the district court erred in overruling plaintiff's exception

XVII to said finding, and in confirming and adopting said finding.

18. The Special Master erred (his report, paragraph 21) in excluding from and not including in the property valued by him as a rating base the following item of real estate, towit: Exhibit
1519 C, Class A, Item 19, Sullivan Reservoir site, which should have been valued in the sum of at least $2,000.00, although the evidence shows, without substantial dispute, that the same and the structures situate thereon, if not actually in use at the present time, are provided for use in the reasonably near future and are a valuable part of the water-works system or plant, and the district court erred in overruling plaintiff's exception XVIII to said finding, and in confirming and adopting said finding.

19. The Special Master erred (his report, paragraphs 25 and 26) in valuing the water rights of the Company upon the basis of their irrigation worth only, without consideration of their peculiar availability and adaptability for the purposes of city supply and without any addition to their value on that account, although the evidence shows, without substantial dispute, that they possess high additional value because of that fact, and the district court erred in overruling plaintiff's exception XIX to said finding, conclusion and method of valuation and in confirming and adopting the same.

20. Special Master erred (his report, paragraph 27) in allowing as the value of the Company's water rights only the sum of $2,947,-617.00, although the evidence shows, without substantial dispute, that such allowance should have been at least the sum of $3,530,000, and the district court erred in overruling plaintiff's exception XX to said finding and conclusion and in confirming and adopting the same.

21. The Special Master erred (his report, paragraphs 28
1520 and 29) in allowing for the Lake Cheesman water right only the sum of $1,611,117.00, although the evidence shows, without substantial dispute that the value of said water right is at least the sum of $2,000,000.00 and the district court erred in overruling plaintiff's exception XXI to said finding and in confirming and adopting the same.

22. The Special Master erred (his report, paragraph 28) in using as the unit price per acre foot upon which to determine the valuation of the Lake Cheesman water right the sum of $55.00, although the evidence shows, without substantial dispute, that such unit price or value, even for irrigation purposes, should not be less than $60.00 per acre foot, and the district court erred in overruling plaintiff's exception XXII to said finding and in confirming and adopting the same.

23. The Special Master erred (his report, paragraph 29) in finding only 54,000 acre feet to be the quantity of water storable in and available for delivery annually by the Cheesman Reservoir, although the evidence shows, without substantial dispute, that said quantity should be at least 57,016 acre feet, on the basis of an assured supply worth $60.00 per acre foot, and a greater quantity if, because of less certainty of supply on a larger draft, a unit price of less than $60.00 per acre foot be applied, and the district court erred in overruling

plaintiff's exception XXIII to said finding and in confirming and adopting the same.

24. The Special Master erred (his report, paragraphs 27 and 30) in allowing only the sum of $949,439.00 as the value of group 1 of the water rights, said group 1 consisting of the following
1521 items of Class B, Exhibit C, towit: Items 1, 2, 3, 4, 13, 14, 15, 16, 17 and 21, although the evidence shows without substantial dispute, that the value of said group of water rights is not less than the sum of $1,150,000.00, and the district court erred in overruling plaintiff's exception XXIV to said finding and in confirming and adopting the same.

25. The Special Master erred (his report, paragraph 30) in taking as the annual yield of said group 1 of water rights only the quantity of 37,000 acre feet, although the evidence shows without substantial dispute, that said yield for irrigation purposes, would be not less than 40,000 acre feet, and for purposes of city supply of much larger quantity, and the district court erred in overruling plaintiff's exception XXV to said finding and in confirming and adopting the same.

26. The Special Master erred (his report, paragraph 30) in employing the unit price or value of $55.00 per acre foot in arriving at the value of said group 1 of water rights, although the evidence shows without substantial dispute that said unit price or value should be at least $60 per acre foot, and the district court erred in overruling plaintiff's exception XXVI to said finding and in confirming and adopting the same.

27. The Special Master erred (his report, paragraphs 27 to 32 inclusive) in his valuation of water rights, and found too low a value therefor, in that after having determined their value for irrigation purposes only, ignoring their added value as sources of city supply, he deducted therefrom the reproduction cost of the water-works structures and lands appurtenant thereto, although the evidence
1522 shows, without substantial dispute, that such water-works structures and lands are much more costly than those used or useful for irrigation purposes, and although the evidence also shows, without substantial dispute, that the cost of reproduction and therefore the present value of such or similar water rights, equally available and as well adapted to the purposes of city supply, would be more than their total gross value for irrigation purposes without deduction for any structures, lands or other appurtenances whatsoever, and the district court erred in overruling plaintiff's exception XXVII to said finding and method of valuation and in confirming and adopting the same.

28. The Special Master erred (his report, paragraph 36) in excluding from and not including in the property valued by him for a rating base the Harriman Lake structures (Exhibit C, Class I, Item 6), which should have been valued in the sum of at least $11,858.00, although the evidence shows without substantial dispute, that said structures and the land upon which they are situate are presently useful and actually used as a part of the plant for supplying the City and its inhabitants with water, and the district court erred in overruling

plaintiff's exception XXVIII to said finding and in confirming and adopting the same.

29. The Special Master erred (his report, paragraph 37) in excluding from and not including in the property valued by him for a rating base the office and superintendent's residence at Littleton, (Exhibit C. Class J, Items 2-*b* and 6-*a*), which should have been valued in the sum of at least $8,050.00, and the district court
1523 erred in overruling plaintiff's exception XXIX to said finding and in confirming and adopting the same.

30. The Special Master erred (his report, paragraph 38) in excluding from and not including in the property valued as a rating base the structures at Sullivan Reservoir (Exhibit C, Class L, Item 5) which should have been valued at the sum of at least $122,534.00, and the district court erred in overruling plaintiff's exception XXX to said finding and in confirming and adopting the same.

32. The Special Master erred (his report, paragraph 39) is excluding and deducting from his estimate of reproduction cost, and consequent value, of the distribution pipe system the item of paving over mains (Exhibit C, Class S, Item 17), which should have been valued in at least the sum of $539,558.00, although the evidence shows, without substantial dispute, that the additional value in the plant arising therefrom is at least equal to the sum aforesaid, and the district court erred in overruling plaintiff's exception XXXI to said finding and in confirming and adopting the same.

32. The Special Master erred (his report, paragraph 39) *is* excluding and deducting from his estimate of reproduction cost, and consequent value, of the distribution pipe system items of added cost occasioned by railway tracks and other obstructions (Exhibit C, Class S, Items 19-*c*, 20-*a*, 20-*b*, 20-*c*, and 21-*a*), amounting to the sum of at least $109,992.00, although the evidence shows, without substantial dispute, that the value of the distribution system is enhanced
1524 because of said matters in an amount at least equal to the sum aforesaid, and the district court erred in overruling plaintiff's exception XXXII to said finding and in confirming and adopting the same.

33. The Special Master erred (his report, paragraph 39) in excluding and deducting from his estimate of reproduction cost of the distribution pipe system, and consequent value thereof, the item of taps for private consumers (Exhibit C, Class S, Item 25), which should have been valued in the sum of at least $140,038.00, although the evidence shows, without substantial dispute, that the value of the Company's distributing system is enhanced by reason of the existence of such taps, (which have become the property of the Company) by at least the sum aforesaid, and the district court erred in overruling plaintiff's exception XXXIII to said finding and in confirming and adopting the same.

34. The Special Master erred (his report, paragraph 40) in excluding from and not including in the property valued by him for a rating base the personal property on the Platte Valley ranches, used for farming purposes, (Exhibit C, Class T, Items 19 and 20), which should have been valued in the sum of approximately $28,159.00,

although the evidence shows, without substantial dispute, that the retention of said ranches and the conducting of farming operations thereon are necessary to the proper conservation and full preservation of the water rights used for city supply, and the district court erred in overruling plaintiff's exception XXXIV to said finding and in confirming and adopting the same.

1525 35. The Special Master erred (his report, paragraph 40) in excluding from and not considering in connection with his valuation of personal property (Exhibit C, Class T) all overhead expenses, amounting to not less than $25,000.00, although the evidence shows without substantial dispute, that such expense is necessarily incurred in assembling, arranging and distributing such property and making it available for use, and that it adds to the value thereof not less than the sum aforesaid, and the district court erred in overruling plaintiff's exception XXXV to said finding and in confirming and adopting the same.

36. The Special Master erred (his report, paragraph 42) in excluding from and not including in his estimate of reproduction cost and consequent value, of the entire plant the item of preliminary expense and cost of organization (Exhibit C, page 64), which should have been valued at the sum of at least $120,000.00, although the evidence shows, without substantial dispute, that such cost must necessarily be incurred, in addition to all overhead expense covered by other allowances, and that it adds value to the plant in at least the sum aforesaid, and the district court erred in overruling plaintiff's exception XXXVI to said finding and in confirming and adopting the same.

37. The Special Master erred (his report, paragraph 43) in wholly excluding from consideration and failing to make any allowance whatsoever for working capital, although the evidence shows without dispute, that it is necessary for the Company to supply a working capital of not less than $100,000.00, and the district court

1526 erred in overruling plaintiff's exception XXXVII to said finding and exclusion and in confirming and adopting the same.

38. The Special Master erred (his report, paragraph 46) in fixing the going value of the plant at only $800,000.00, whereas the evidence shows, without dispute, that said value should be at least $1,200,000.00, and the district court erred in overruling plaintiff's exception XXXVIII to said finding and in confirming and adopting the same.

GERALD HUGHES,
CLAYTON C. DORSEY,
Solicitors for Plaintiff and Cross-Appellant.

(Endorsed:) Court No. 6274. Div. Equity. In the U. S. District Court, district of Colorado. The Denver Union Water Company, Plaintiff, vs. City and county of Denver et al., Defendants. Plaintiff's Assignment of Errors on Cross Appeal. Filed Jul. 29, 1916. Charles W. Bishop, Clerk. Hughes & Dorsey, Attorneys for Plaintiff. No. —.

1175

UNITED STATES OF AMERICA,
District of Colorado, ss:

In the District Court of the United States for the District of Colorado.

No. 6274. In Equity.

THE DENVER UNION WATER COMPANY, a Corporation, Complainant,
vs.
CITY AND COUNTY OF DENVER, ROBERT W. SPEER, as
1527 Mayor of the City and County of Denver; W. F. R. Mills, as Manager of Improvements and Parks of the City and County of Denver; Clair J. Pitcher, as Manager of Revenue of the City and County of Denver; William H. Sharpley, as Manager of Health and Charity of the City and County of Denver; Dewey C. Bailey, as Manager of Safety and Excise of the City and County of Denver; James F. Markey, as Auditor of the City and County of Denver; Charles A. Lammers, as Clerk and Recorder of the City and County of Denver; Louis F. Bartels, J. A. Burnett, John Conlon, W. C. Danks, D. J. Monaghan, J. B. Rycraft, Thomas O. Spacy, Jesse M. Wheelock, and Harry Zimmerhackel, as Members of and Constituting the Council of the City and County of Denver; and Armour C. Anderson, as Sole Member of and Constituting the Public Utilities Commission of the City and County of Denver, Defendants.

Petition for Cross-Appeal.

The above named plaintiff, The Denver Union Water Company—in no wise complaining of the final decree in this cause which was in its favor—but conceiving itself aggrieved by certain orders and rulings of the Court, and certain rulings, findings and conclusions of the Special Master, approved, confirmed and adopted by the court, as more particularly specified in the assignment of errors which is filed herewith, only in the event that the Supreme Court of the
United States should, upon the appeal taken herein by the
1528 defendants, sustain the assignments of error made by said defendants, or some of them, seeks hereby to take a cross appeal in this cause to the Supreme Court of the United States to be considered in connection with and in opposition to the contentions of said defendants, as appellants in said appeal, to the Supreme Court taken in said cause by the said defendants—the reasons for said cross appeal being specified in the assignment of errors which is filed herewith, and your petitioner prays that said cross appeal may be allowed, to be considered in connection with and in opposition to said appeal of the defendants; and it is further prayed that a transcript of the record, proceedings and papers upon which said rulings and orders complained of in said assignments of error were made, duly authenticated, may be sent to the Supreme Court of the United States to the end that said rulings and orders, and plaintiff's objections thereto, may be before the Supreme Court for its consideration

and determination in connection with said appeal heretofore taken by said defendants, and in opposition to the reversal of the decree in favor of plaintiff heretofore entered herein.

GERALD HUGHES,
CLAYTON C. DORSEY,
Solicitors for Plaintiff and Cross-Appellants.

The foregoing claim of cross appeal is hereby allowed.
Dated at Denver, Colorado, this 29th day of July, A. D. 1916.

1529

ROBT. E. LEWIS,
District Judge.

(Endorsed:) Court No. 6274. Div. —. In the U. S. District Court, District of Colorado. The Denver Union Water Company, Plaintiff, vs. City and County of Denver, et al., Defendant-. Petition for Cross Appeal. Filed Jul. 29, 1916. Charles W. Bishop, Clerk. Hughes & Dorsey, Attorneys for Complainant. No. —.

SATURDAY, July 29th, A. D. 1916.

At Chambers, before the Honorable Robert E. Lewis, district judge, the following proceedings were had:

6274. In Equity.

THE DENVER UNION WATER COMPANY
vs.
THE CITY AND COUNTY OF DENVER, ROBERT W. SPEER, as Mayor of the City and County of Denver; W. F. R. Mills, as Manager of Improvements and Parks of the City and County of Denver; Clair J. Pitcher, as Manager of Revenue of the City and County of Denver; William H. Sharpley, as Manager of Health and Charity of the City and County of Denver; Dewey C. Bailey, as Manager of Safety and Excise of the City and County of Denver; Charles A. Lammers, as Clerk and Recorder of the City and County of Denver; Louis F. Bartels, J. A. Burnett, John Conlon, W. C. Danks, D. J. Monaghan, J. B. Ryeraft, Thomas O. Spacy, Jesse M. Wheelock and Harry Zimmerhackel, as Members of and
1530 Constituting the Council of the City and County of Denver; and Armour C. Anderson, as Sole Member of and Constituting the Public Utilities Commission of the City and County of Denver.

Bill for Injunction and for Other Relief.

In this cause, on motion of solicitors for the plaintiff and upon consideration of the assignment of errors and petition for cross appeal to the Supreme Court of the United States, heretofore filed herein by said plaintiff,

It is ordered that a cross appeal herein, as prayed in the petition

therefor and for the purposes therein specified be, and the same is hereby allowed to the said plaintiff; and it is further ordered that the bond on said cross appeal be, and the same is, hereby fixed at the sum of five hundred dollars.

6274.

Bond on Cross-Appeal.

UNITED STATES OF AMERICA,
District of Colorado, ss:

Know all men by these presents, That we, The Denver Union Water Company, a corporation, as principal and National Surety Company, as surety, are held and firmly bound unto the City and County of Denver, Robert W. Speer as Mayor of the city and county of Denver, W. F. R. Mills as Manager of Improvements and Parks of the city and county of Denver, Clair J. Pitcher as Manager of Revenue of the city and county of Denver, William H.
1531 Sharpley as Manager of Health and Charity of the city and county of Denver, Dewey C. Bailey as Manager of Safety and Excise of the city and county of Denver, James F. Markey, as auditor of the city and county of Denver, Charles A. Lammers as clerk and recorder of the city and county of Denver; Louis F. Bartels, J. A. Burnett, John Conlon, W. C. Danks, D. J. Monaghan, J. B. Rycraft, Thomas O. Spacy, Jesse M. Wheelock and Harry Zimmerhackel, as members of and constituting the council of the city and county of Denver; and Armour C. Anderson as sole member of and constituting the Public Utilities Commission of the city and county of Denver, in the full and just sum of five hundred & 00/100 dollars ($500.00) to be paid to the said obligees above named, their respective successors or assigns, for which payment well and truly to be made we bind ourselves, our successors and assigns, jointly and severally, firmly by these presents.

Sealed with our seals and dated this 29th day of July, in the year of our Lord One thousand nine hundred and sixteen.

Whereas, lately, at the November 1915 Term of the United States District Court for the District of Colorado, in a suit pending in said court between The Denver Union Water Company, plaintiff, and the obligees above named, as defendants, a decree was entered against said defendants and in favor of said plaintiff, and said defendants have obtained an appeal from said District Court to the Supreme Court of the United States to reverse the said decree in the aforesaid suit, and said The Denver Union Water Company has likewise obtained a cross appeal from said District Court to the Su-
1532 preme Court of the United States for the purpose of presenting to the Supreme Court certain rulings and orders of said District Court, and certain rulings, findings and conclusions of the Special Master herein, approved, confirmed and adopted by said district court, to be considered, however, only in connection with said appeal of the said defendants and in opposition to the reversal of

the decree heretofore rendered and entered herein by the District Court, and has likewise obtained a citation upon said cross appeal, directed to said defendants, citing them to be and appear in the Supreme Court of the United States at Washington, D. C. thirty (30) days from and after the date of said citation.

Now, the condition of this obligation is such, that if said The Denver Union Water Company shall prosecute said cross appeal to effect, and answer all costs if it shall fail to sustain said cross appeal then the obligation to be void, else to remain in full force and effect.

[CORPORATE SEAL.] THE DENVER UNION WATER COMPANY, *Principl,*
By W. P. ROBINSON, *President.*

Attest:
T. E. UNDERWOOD,
Assistant Secretary.

[CORPORATE SEAL.] NATIONAL SURETY COMPANY, *Surety,*
By C. H. TONCRAY,
Attorney in Fact.

The foregoing bond is approved this 29" day of July,
1533 A. D. 1916.

ROBT. E. LEWIS,
District Judge.

(Endorsed:) 6274. Plaintiff's Bond on Cross Appeal. $500.00. Filed Jul. 29, 1916. Charles W. Bishop, Clerk.

1534 *Stipulation.*

UNITED STATES OF AMERICA,
District of Colorado, ss:

In the District Court of the United States for the District of Colorado.

No. 6274. In Equity.

THE DENVER UNION WATER COMPANY, a Corporation, Complainant.
vs.
CITY AND COUNTY OF DENVER, ROBERT W. SPEER, AS MAYOR OF THE City and County of Denver; W. F. R. Mills, as Manager of Improvements and Parks of the City and County of Denver; Clair J. Pitcher, as Manager of Revenue of the City and County of Denver; William H. Sharpley, as Manager of Health and Charity of the City and County of Denver; Dewey C. Bailey, as Manager of Safety and Excise of the City and County of Denver; James F. Markey, as Auditor of the City and County of Denver; Charles A. Lammers, as Clerk and Recorder of the City and County of Denver; Louis F. Bartels, J. A. Burnett, John Conlon, W. C.

Danks, D. J. Monaghan, J. B. Rycraft, Thomas O. Spacy, Jesse M. Wheelock, and Harry Zimmerhackel, as members of and constituting the Council of the City and County of Denver; and Armour C. Anderson, as sole member of and constituting the Public Utilities Commission of the City and County of Denver; Defendants.

1535 It is hereby stipulated, by and between the parties hereto, by their respective solicitors, that for the purpose of the cross appeal to the Supreme Court of the United States heretofore prayed by and allowed to the plaintiff, The Denver Union Water Company as cross appellant, the same record, including narrative statement and exhibits, may be used as is supplied and determined upon for the purpose of the original appeal wherein the defendants above named are appellants and The Denver Union Water Company appellee; that one such record shall answer for both said appeal and said cross appeal, and that for both said purposes the Clerk of said District Court need prepare, certify and transmit to the Supreme Court but one transcript of said record, and said one transcript shall suffice in said Supreme Court for both said appeal and said cross appeal.

GERALD HUGHES,
CLAYTON C. DORSEY,
Solicitors for Plaintiff.
J. A. MARSH,
F. W. SANBORN,
Solicitors for Defendants.

(Endorsed:) Court No. 6274. Div. —. In the U. S. District Court, District of Colorado. The Denver Union Water Company, Plaintiff, vs. City and County of Denver, et al, Defendants. Stipulation as to Record on Appeal and Cross-Appeal. Filed Jul-
1536 29, 1916, Charles W. Bishop, Clerk. Hughes & Dorsey, Attorneys for Complainants. No. —.

UNITED STATES OF AMERICA,
District of Colorado, ss:

In the District Court of the United States for the District of Colorado.

No. 6274. In Equity.

THE DENVER UNION WATER COMPANY, a Corporation, Complainant,
vs.
CITY AND COUNTY OF DENVER, ROBERT W. SPEER, AS MAYOR OF THE City and County of Denver; W. F. R. Mills, as Manager of Improvements and Parks of the City and County of Denver; Clair J. Pitcher, as Manager of Revenue of the City and County of Denver; William H. Sharpley, as Manager of Health and Charity of the City and County of Denver; Dewey C. Bailey, as Manager of Safety and Excise of the City and County of Denver; James

F. Markey, as Auditor of the City and County of Denver; Charles A. Lammers, as Clerk and Recorder of the City and County of Denver; Louis F. Bartels, J. A. Burnett, John Conlon, W. C. Danks, D. J. Monaghan, J. B. Rycraft, Thomas O. Spacy, Jesse M. Wheelock, and Harry Zimmerhackel, as members of and constituting the Council of the City and County of Denver; and Armour C. Anderson, as sole member of and constituting the Public Utilities Commission of the City and County of Denver; Defendants.

1537 *Præcipe.*

The Clerk of the above named United States District Court will please prepare copies of the following papers and proceedings in making up the transcript upon the appeal of defendants, and cross appeal of plaintiff, in the above entitled cause, to the Supreme Court of the United States, towit:

Bill of complaint.

Amendment to bill of complaint eliminating original paragraph 24.

Answer.

Order of Reference to Special Master, W. J. Chinn.

Second amendment to bill of complaint incorporating new paragraph 24.

Answer to amendment.

Amendment to answer.

Report of Special Master.

Narrative statement of evidence and exhibits as heretofore stipulated, including transcript of stenographer's notes of proceedings February 1st, 1916.

Order for filing exceptions and hearing on the same.

Exceptions of plaintiff to Master's Report.

Exceptions of defendants and each of them to Master's Report.

Order striking exceptions and confirming Master's Report, and ordering final decree.

Petition of defendants for correction of record.

1538 Order denying last named petition for correction of record.

Final decree.

Petition for substitution of parties defendant.

Order granting said last named petition.

Assignment of errors.

Petition of defendants for appeal.

Order granting said petition for appeal and fixing bond.

Bond.

Citation on appeal of defendants and acknowledgment of service thereof.

Plaintiff's assignment of errors on cross appeal.

Petition of plaintiff for cross appeal.

Order granting said petition for cross appeal and fixing bond.

Bond on cross appeal.

Citation on cross appeal and acknowledgment of service thereof.
Stipulation concerning record on cross appeal.
This præcipe.

JAMES A. MARSH,
F. W. SANBORN,
Solicitors for Defendants.

The complainant above named, by its solicitors, hereby acknowledges service of a copy of the foregoing præcipe at Denver,
1539 Colorado, this 10th day of August, 1916, and hereby waives its right to file an additional præcipe and to have 10 days time for that purpose as provided by Rule 8 of the U. S. Supreme Court and Equity Rule 75.

Both parties to this cause, by their respective solicitors, hereby waive the filing by plaintiff of a præcipe for a record upon its cross appeal, and the preparation, certification and filing of a separate record for that purpose; and hereby stipulate that the record prepared, certified and filed pursuant to the foregoing præcipe may serve as the record for the purposes of said cross appeal of plaintiff as well as for the purposes for said appeal of defendants.

GERALD HUGHES,
C. C. DORSEY,
Solicitors for Complainant.
JAMES A. MARSH,
F. W. SANBORN,
Solicitors for Defendants.

(Endorsed:) No. 6274. United States District Court. The Denver Union Water Company, Complainant, vs. City and County of Denver, et al, Defendants. Præcipe for Transcript on Appeal. Filed Aug. 14, 1916. Charles W. Bishop, Clerk.

1540 *Citation on Appeal.*

UNITED STATES OF AMERICA,
District of Colorado:

The President of the United States of America to the Denver Union Water Company, Greeting:

You are hereby cited and admonished to be and appear in the Supreme Court of the United States, at the city of Washington, in the District of Columbia, thirty (30) days after the date of this citation, pursuant to an appeal allowed and filed in the clerk's office of the United States District Court for the district of Colorado, wherein City and County of Denver, Robert E. Speer, as Mayor of the city and county of Denver, W. F. R. Mills as Manager of Improvements and Parks of the city and county of Denver, Clair J. Pitcher as Manager of Revenue of the city and county of Denver, William H. Sharpley as Manager of Health and Charity of the city and county of Denver, Dewey C. Bailey as Manager of Safety and Excise of the city and county of Denver, James F. Markey, as auditor of the city

and county of Denver, Charles A. Lammers as clerk and recorder of the city and county of Denver, Louis F. Bartels, J. A. Burnett, John Conlon, W. C. Danks, D. J. Monaghan, J. B. Rycraft, Thomas O. Spacy, Jesse M. Wheelock and Harry Zimmerhackel, as members of and constituting the council of the city and county of Denver; and Armour C. Anderson as sole member of and constituting the Public Utilities Commission of the city and county of Denver, are appellants, and you are appellee, to show cause, if any there be, why
1541 the various errors alleged and referred to in said appeal and specified in the assignment of errors filed in connection therewith, should not be corrected, and why speedy justice should not be done the parties in that behalf.

Witness, the Honorable Robert E. Lewis, Judge of the District Court of the United States for the district of Colorado, this twenty-ninth day of July, A. D. 1916.

ROBT. E. LEWIS,
Judge of the United States District Court
for the District of Colorado.

The undersigned, solicitors for the appellee named in the foregoing citation, hereby acknowledge service of said citation upon said appellee, at Denver, Colorado, this twenty-ninth day of July, A. D. 1916.

GERALD HUGHES.
CLAYTON C. DORSEY.

1541½ [Endorsed:] 6274. U. S. District Court, District of Colorado. The Denver Union Water Company vs. The City and County of Denver et al. Citation on Appeal. Filed Jul-29, 1916. Charles W. Bishop, Clerk.

1542 *Citation on Cross Appeal.*

UNITED STATES OF AMERICA,
District of Colorado, ss:

The President of the United States to the City and County of Denver, Robert W. Speer as Mayor of the City and County of Denver; W. F. R. Mills, as Manager of Improvements and Parks of the City and County of Denver; Clair J. Pitcher as Manager of Revenue of the City and County of Denver; William H. Sharpley, as Manager of Health and Charity of the City and County of Denver; Dewey C. Bailey, as Manager of Safety and Excise of the City and County of Denver, James F. Markey, as auditor of the City and County of Denver; Charles A. Lammers, as Clerk and Recorder of the City and County of Denver; Louis F. Bartels, J. A. Burnett, John Conlon, W. C. Danks, D. J. Monaghan, J. B. Rycraft, Thomas O. Spacy, Jesse M. Wheelock, and Harry Zimmerhackel, as members of and constituting the Council of the City and County of Denver, and Armour C. Anderson, as Sole member of and Constituting the Public Utilities Commission of the City and County of Denver, Greeting:

You, and each of you, are hereby cited and admonished to be and appear in the Supreme Court of the United States, at the City of Washington, in the District of Columbia, thirty (30) days after the date of this citation, pursuant to a cross appeal allowed and filed in the Clerk's office of the United States District Court for the District of Colorado, wherein The Denver Union Water Company is cross appellant and you are cross appellees, to show cause, if any there be, why the various errors alleged and referred to in said cross appeal and specified in the assignment of errors filed in connection
1543 therewith, should not be corrected, and why speedy justice should not be done the parties in that behalf.

Witness, the Honorable Robert E. Lewis, Judge of the District Court of the United States for the District of Colorado, this 29th day of July, A. D. 1916.

ROBT. E. LEWIS,
Judge of the United States District Court for the District of Colorado.

The undersigned, solicitors for the cross appellees named in the foregoing citation, hereby acknowledge service of said citation upon said cross appellees, at Denver, Colorado, this 29th day of July, A. D. 1916.

J. A. MARSH,
F. W. SANBORN,
Solicitors for said Cross Appellees.

1543½ [Endorsed:] 6274. U. S. District Court, District of Colorado. The Denver Union Water Company vs. The City and County of Denver et al. Citation on cross-appeal. Filed Jul- 29, 1916. Charles W. Bishop, Clerk.

POOR COPY

UNITED STATES OF AMERICA,
District of Colorado, ss:

I, Charles W. Bishop, clerk of the district court of the United States for the district of Colorado, do hereby certify that the above and foregoing transcript, consisting of six (6) volumes; Volume No. I pages numbered from one (1) to two hundred twenty (220) inclusive; Volume No. II pages numbered two hundred twenty-one (221) to four hundred seventy-nine (479) inclusive; Volume No. III pages numbered four hundred eighty (480) to nine hundred seventy-eight (978) inclusive; Volume No. IV pages numbered nine hundred seventy-nine (979) to eleven hundred nineteen (1119) inclusive; Volume No. V pages numbered eleven hundred twenty (1120) to fourteen hundred twenty-six (1426) inclusive; Volume No. VI pages numbered fourteen hundred twenty-seven (1427) to fifteen hundred forty-three (1543) inclusive, to be a true, perfect and complete transcript and copy of the pleadings, and other matters set forth in the praecipe filed herein, together with a true copy of such prænipe, heretofore filed and entered of record in said court and in a certain cause lately in said court pending, wherein The Denver Union Water Company was plaintiff and the City and County of Denver, et al, were defendants, as fully and completely as the same still remain on file and of record in my office at Denver.

In testimony to the above, I do hereunto sign my name and affix the seal of said court, at the city and county of Denver, in said district, this twenty-seventh day of September, A. D. 1916.

[Seal United States District Court, District of Colorado.]

CHARLES W. BISHOP, *Clerk.*

Endorsed on cover: File No. 25,566. Colorado, D. C. U. S. Term No. 736. City and County of Denver et al., appellants, vs. The Denver Union Water Company. File No. 52,567. Term No. 737. The Denver Union Water Company appellant, vs. City and County of Denver et al. Filed October 23rd, 1916. File Nos. 25,566 and 25,567.

In the Supreme Court of the United States

October Term, 1916

No. [redacted]

CITY AND COUNTY OF DENVER, ET AL.,
Appellants,

vs.

THE DENVER UNION WATER COMPANY,
Appellee.

THE DENVER UNION WATER COMPANY,
Appellant,

vs.

CITY AND COUNTY OF DENVER, ET AL.,
Appellees.

MOTION TO ADVANCE.

JAMES A. MARSH,
NORTON MONTGOMERY,
Solicitors for City and County of Denver, et al.

GERALD HOPKINS,
CLAYTON C. DENNIS,
Solicitors for The Denver Union Water Co.

THE BYRON S. ADAMS PRINTING CO., 1916 Lawrence Street.

MAY

In the Supreme Court of the United States

Nos. 736 and 737.

CITY AND COUNTY OF DENVER, ET AL.,
Appellants,

vs.

THE DENVER UNION WATER COMPANY,
Appellee.

THE DENVER UNION WATER COMPANY,
Appellant,

vs.

CITY AND COUNTY OF DENVER, ET AL.,
Appellees.

MOTION TO ADVANCE.

Come now the above appellants and appellees, and respectfully represent to the court that this is an appeal and cross-appeal from the United States District Court for the District of Colorado, the case below being entitled "The Denver Union Water Company, a Corporation, Plaintiff, vs. The City and

County of Denver, et al., Defendants. In Equity, No. 6274." The action was commenced April 29, 1914, by The Denver Union Water Company, plaintiff, by reason of the passage of an ordinance by the City and County of Denver on March 3, 1914 (the same being Ordinance No. 26 of the Series of 1914), which ordinance attempts to regulate and fix the charges to be made by the plaintiff for water furnished the City and County of Denver and its inhabitants, the effect of the ordinance being to make a reduction of twenty per cent of the rates then being charged the City and County of Denver and its inhabitants by plaintiff.

A temporary restraining order was granted by the United States District Court against the City and County of Denver and its officers, restraining it from enforcing said ordinance; and thereafter a special master was appointed by the court, to whom the matter was referred.

Upon the presentation of the master's report, which found in favor of the plaintiff, the court on February 1, 1916, entered final decree perpetually restraining defendants from enforcing the ordinance referred to, from which decree the defendants prayed an appeal to this court, and the record in said cause is now here lodged and is in process of printing by the clerk of this court.

All parties herein now respectfully move that the case be advanced for early hearing in this court because:

FIRST.

No appellate review was sought to review the action of the court below in granting the temporary injunction issued herein as is authorized by Section 7 of the Act of March 3, 1891, 26 Stats. 826, as amended; 28 Stats. 866; and again by 31 Stats. 160, now Section 129 Federal Code; Act of March 3, 1911, 36 Stats. 1134. However, we submit that prompt review of matters of this character are within the spirit and purpose of the provisions of the statutes referred to.

SECOND.

The City and County of Denver, and all its inhabitants, are solely dependent for water supply, at the present time, upon the plant of The Denver Union Water Company. The ordinance above referred to had the effect of reducing the amount that they should pay for water twenty per cent of the amount that they were then paying. Since the order and judgment of the court below granting the temporary restraining order, the City and County of Denver, and its inhabitants, have been paying to the said company the full amount of its charges and the rates prevailing before the ordinance was adopted, and in the event that the judgment of the court below is reversed by this court on appeal, the effect will be that during the interim between the granting of said temporary restraining order and the time that this court passes upon said cause, the City and County of Denver, and its inhabitants, will have paid to The Denver Union

Water Company twenty per cent more than under said ordinance they should have paid.

That the population of the City and County of Denver is about 225,000, which means that many thousands of different transactions with The Denver Union Water Company are involved. The population of the City and County of Denver is constantly changing,—people moving away and others filling their places,—and in the event of a reversal by this court of the said decree, it will be extremely difficult to adjust the rights claimed by the water users as between the Water Company and said water users, each day's delay will make it more difficult, and if this cause is not advanced the consequent delay will render it impossible.

THIRD.

Since the decision of this court in the case of City and County of Denver vs. New York Trust Company, consolidated with City and County of Denver vs. Denver Union Water Company, et al., 229 U. S. 123, in which case it was held that the City and County of Denver was at liberty, so far as any contract with The Denver Union Water Company was concerned, to erect and construct, or otherwise acquire, its own water system, the City and County of Denver has been attempting the acquisition of a municipal water system, either by acquiring the system of The Denver Union Water Company, the present company, or by the construction of a new and independent system. That the City and County of Denver has, by the making of extensive surveys, and

otherwise, made some progress in the acquisition of its own plant, but until this cause is decided by this court the City and County of Denver is unable to determine the most advantageous and feasible course to pursue in acquiring a water system, or in proceeding further in the construction of its own system.

The property constituting the plant of the Water Company is subject to certain mortgages given to secure bonds now outstanding and in the hands of the public in the aggregate amount of $12,000,000.00. Of these, bonds in the aggregate amount of $8,000,000.00 are now overdue. The unusual situation outlined above, and the chaotic condition resulting therefrom has rendered it impossible for the company to re-finance, or to secure an extension of said bonds, which, under normal conditions, it could readily have done. Suit has been brought by the trustee under the mortgage securing said bonds, and is now pending in the United States District Court for the District of Colorado, for the foreclosure of said mortgage. The equity of the Water Company, if any, and whatever its amount, and of its numerous stockholders in said properties, is by the present condition of uncertainty, seriously endangered, and if such condition continue, may be wholly lost. The securities of said Water Company are widely held, and its bondholders and stockholders numerous. All of them are seriously prejudiced by the present situation and further delay will be seriously detrimental to, if not wholly destructive of, their interests.

In the court below the master in his report, as a means of arriving at the rates to be charged, determined the value of the plant of The Denver Union Water Company, and found it to be of the value of $13,415,899.00 as of May 1, 1914. Exception was taken by the City and County of Denver, et al. to this finding, and to the allowance of several items going to make up the same, and this court in passing upon the questions involved will be asked to determine the value of appellee's property, or as to whether several items therein should be allowed, which determination will undoubtedly furnish a basis for further action on the part of the City and County of Denver in the acquisition of a municipal water plant.

The matter is one of great importance to a large and rapidly growing municipality. Much delay has already been caused on account of the pending of this and other controversies affecting the rights of the parties in the courts, and all parties will suffer by further delay unless the cause is advanced to early hearing and determination in this court.

JAMES A. MARSH,
NORTON MONTGOMERY,
Solicitors for City and County of Denver, et al.

GERALD HUGHES,
CLAYTON C. DORSEY,
Solicitors for The Denver Union Water Co.

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In the Supreme Court of the United States

Nos. 736 and 737.

CITY AND COUNTY OF DENVER, ET AL.,
Appellants,

vs.

THE DENVER UNION WATER COMPANY,
Appellee.

THE DENVER UNION WATER COMPANY,
Appellant,

vs.

CITY AND COUNTY OF DENVER, ET AL.,
Appellees.

BRIEF OF CITY AND COUNTY OF DENVER.

Statement of Case.

This case is in this Court on appeal from the judgment and decree of the United States District Court for the District of Colorado.

On April 9, 1914, the suit was begun by The Denver Union Water Company, appellee herein, to restrain the enforcement of a certain ordinance of the City and County of Denver, appellant, known as Ordinance No. 26 of the Series of 1914 (and hereinafter referred to as the Ordinance of 1914), on the ground that the enforcement of the ordinance would be in violation of amendments Nos. V and XIV of the Constitution of the United States, as being confiscatory of complainant's property. It was asked that the Ordinance of 1914 be declared unconstitutional, null and void, and that an injunction issue preventing its enforcement. It was further asked that the decree declare the complainant entitled to just, fair and reasonable compensation for its services in supplying water, based upon the value of the property of the complainant necessarily used for such purpose, and so as to yield sufficient income to pay operating expenses and taxes and a sum for annual depreciation of its property and water system and obsolescence, and to provide for the replacement of portions of its property, and for repairs, renewals, etc., and to yield in addition a net income in excess of 8 per cent on the valuation of such property. The bill of complaint asked for a determination of the value of the property and water system of complainant and the reasonable value of the services rendered and to be rendered by complainant to the City and County of Denver.

The case was referred to a Special Master, who after taking evidence, filed a report with the District Court holding and determining that the Ordinance

of 1914 was violative of the 5th and 14th amendments of the Constitution of the United States, and was invalid.

The report of the Master was approved and confirmed by the District Court, and the appellant was enjoined from attempting to enforce the ordinance in question.

The judgment and decree declared that the ordinance is in all respects invalid and of no force or effect whatsoever, in that it attempted to and does deprive complainant of its property without due process of law, and takes the private property of complainant for public use without just compensation. From this judgment and decree the City and County of Denver, and its officers who are parties, took this appeal to this Court, and The Denver Union Water Company has filed cross-errors. In this brief The City and County of Denver and its officers will be referred to as appellant and The Denver Union Water Company as the appellee.

The ultimate question in the case is that of confiscation of complainant's property if the ordinance is enforced.

In addition to the Transcript of Record to which reference will frequently be made throughout the course of this brief, there is, among other exhibits, an original exhibit, the same being known as "Exhibit C," which has been certified to this Court from the court below, to which frequent references will be made in this brief.

The City and County of Denver (formerly the City of Denver) is situated in a semi-arid region

upon the great plains a few miles east of the front range or continental divide of the Rocky Mountains. Its population, as shown by the United States Census for the year 1910, was 213,381.

In 1870, Denver having grown beyond the stage of a village, it became necessary to provide it with a plant or system for furnishing it and its inhabitants with water, and in that year The Denver City Water Company commenced operations (Trans., p. 5), and in 1871 constructed its first works looking toward the building of a system for supplying the city and its inhabitants with water. Thereafter and at different times down to the year 1894 about eight different water companies, in addition to the complainant company and The South Platte Canal & Reservoir Company, the last named being a subsidiary of the complainant company, were organized for the purpose of supplying with water certain parts of the then City of Denver, and certain surrounding small towns and villages, which towns and villages thereafter became consolidated and incorporated into one municipality which is the present City and County of Denver, the appellant herein.

In 1894 The Denver Union Water Company, appellee, was organized, and succeeded to the rights, property and business of the various companies hereinabove mentioned.

In 1894 there was also organized The South Platte Canal & Reservoir Company above referred to, as a subsidiary of The Denver Union Water Company, and in all the proceedings herein involved the property of this company has been treated as part and parcel of The Denver Union Water Company.

The system for the diversion, storage and carriage of waters used by the City and County of Denver was installed in part by The Denver Union Water Company and its predecessors, and in part by the South Platte Canal & Reservoir Company, so that the ages of the various parts of the system vary from shortly after the year 1870 down to the last installations of The Denver Union Water Company previous to the bringing of this suit (Exhibit "C," pp. 8 to 10, inclusive).

Among the assets taken over by The Denver Union Water Company from The Denver Water Company was a certain franchise evidenced by Ordinance No. 44 of the Series of 1890, and herinafter called the 1890 Ordinance (Trans., p. 941). The term of this franchise was 20 years. It granted the privilege of laying water pipes in the City of Denver, fixed the water rates to be charged by the company, and contained two clauses or paragraphs (11 and 12) which afterward became the source of much litigation between the City of Denver and the City and County of Denver on the one side, and The Denver Union Water Company on the other. The Denver Union Water Company exacted charges under the schedule of the 1890 ordinance down to the year 1895, at which time it voluntarily adopted a new schedule of charges which was more favorable to Denver and its inhabitants than the rates provided in the 1890 Ordinance, and the rates provided by this new schedule, called the "leaflet schedule," were substantially in force down to the bringing of this suit.

In 1890 the franchise of The Denver Union Water Company, transferred to it from The Denver

Water Company, expired; and at that time action was taken by the Water Company and the City and County looking to a possible purchase of the water plant and system by the City and County of Denver; but no purchase resulted from this action because of disagreement between the Water Company and the City and County as to the price to be paid therefor.

Section 11 of the 1890 Ordinance provided that on the expiration of 20 years after the passage of the ordinance the City should have the *right* to purchase the property of the Water Company at a price to be determined by a Board of Appraisers, and Section 12 of the ordinance provided that the City *might, if it saw fit*, extend the franchise of the Water Company for a further period of 20 years.

The City and County of Denver declined to exercise either of these alternatives, and in consequence a suit was begun by The New York Trust Company, Trustee, for the bondholders of the Water Company, to compel the City and County to purchase under the appraisement, and the Water Company filed a cross-bill to compel the City and County to renew the franchise, or rather that the right to a renewal of its franchise for another 20 years be established. This cause, entitled "New York Trust Company vs. City and County of Denver," 229 U. S. 123, was determined by this Court, which held that neither the claim of the Trust Company nor that of the Water Company was tenable.

During this same year, 1910, the City and County of Denver adopted a charter provision known as Section 264-A, under which a Public Utilities

Commission was created, having wide powers with reference to determining the further course of the City and County of Denver in dealing with the question of its water supply, and action was taken by this Commission toward the establishment for the City and County of Denver of a municipally owned water system.

Since 1910 The Denver Union Water Company, although without a franchise, has continued to serve the City and County of Denver and its inhabitants with water, charging for such service the rates prescribed in the "leaflet schedule" already mentioned.

In 1914 the City and County of Denver enacted Ordinance No. 26 of the Series of 1914 involved in this cause.

It is agreed that the effect of the Ordinance of 1914 is to reduce the rate charged under the "leaflet schedule" by approximately 20 per cent, and it is this ordinance which the appellee is seeking to have declared null and void, and its enforcement enjoined as violative of Amendments V and XIV of the Federal Constitution.

The bill of complaint of appellee (complainant below) is voluminous. It charges, among other things, that it and its predecessors have been furnishing water to the City and County of Denver since shortly after the organization of the earliest organized of its predecessors. It describes in great detail the growth of the company and its predecessors, the development of the City and County of Denver, the various disputes which have arisen between the Water Company and its predecessors and the City

and City and County, and charges that the 1914 ordinance (referred to in the bill of complaint as Exhibit "A") will so reduce the rate of return received by the Water Company as to net the company only 2.88% on the actual value of its property. The appellee further charges that the rate of return which will be received by the Company, in case the 1914 ordinance is enforced, is so small that the Company will be deprived of its property without due process of law, and that its property will be taken for public use without just compensation.

The answer of the appellants (defendants below) admits many of the matters set forth in the bill of complaint, particularly with reference to the history of complainant and its disputes and those of its predecessors with the City and City and County of Denver. It denies that the complainant has ever been engaged in "furnishing" water to the City or City and County, or its inhabitants, and alleges that the Water Company has acted merely as a *carrier* in transporting water from the place of its origin to Denver, and that the ownership of all water rights and rights to water carried through the Company's plant are the property of Denver and its inhabitants. It denies that the 1914 ordinance if enforced will result in complainant receiving only 2.88% return upon its investment, and alleges that the return will be far greater than this. It admits the adoption of the 1914 ordinance, but denies that the same has the effect of depriving complainant of its property without due process of law, or amounts to the taking of complainant's property for public use without just compensation. The answer denies the existence

either in whole or in part of many of the items making up the alleged valuation of complainant's plant which in the bill of complaint are alleged to exist.

By way of a fourth defense to the bill of complaint, the answer charges that the Company does not operate, and has not for many years operated, its plant in an economical manner, and charges that if the operations of the Company should be carried on economicaly and efficiently, the expenses of the Company would be thereby reduced, and that the rates and charges fixed by the Ordinance of 1914 will yield the Company a fair and adequate return upon the actual value of all the Company's plant and property used and useful in and about the business which it undertakes to perform for the City and County of Denver and its inhabitants.

Having referred briefly to the character of this action, the history of the appellee company and its antecedents, and to its status with reference to furnishing water at the time the ordinance complained of was passed, consideration will now be given to the questions that naturally present themselves as worthy of consideration in determining whether the Special Master and the court below erred in arriving at their conclusions.

The questions for discussion are as follows, and will be treated in the order named:

I.

When will courts forbid the enforcement of a rate making statute as violative of constitutional guaranties?

II.

Burden and extent of proof required.

III.

Fair value of complainant's plant and property.

(a) Water rights.

(b) Going concern.

(c) Overhead charges and interest during construction.

(d) General considerations.

IV.

Depreciation.

V.

Operating expenses.

VI.

Rate of return.

VII.

Conclusion.

ARGUMENT.

I.

When Will Courts Forbid the Enforcement of a Rate Making Statute as Violative of Constitutional Guaranties?

The answer to this question has been stated by this Court in the case of *Knoxville vs. Water Company*, 212 U. S. 1, and at page 8, as follows:

"The purpose of this suit is to arrest the operation of a law on the ground that it is void and of no effect. It happens that in this particular case it is not an act of the legislature that is attacked, but an ordinance of a municipality. Nevertheless the function of rate making is purely legislative in its character, and this is true whether it is exercised directly by the legislature itself or by some subordinate or administrative body, to whom the power of fixing rates in detail has been delegated. The completed act derives its authority from the legislature and must be regarded as an exercise of the legislative power. Prentis vs. Southern Ry. Co., 211 U. S. 210; Honolulu Transit Co. vs. Hawaii, 211 U. S. 282. There can be at this day no doubt on the one hand, that the courts on constitutional grounds may exercise the power of refusing to enforce legislation, nor on the other hand, that the power ought to be exercised only in the clearest cases. The constitutional invalidity should be manifest, and where that invalidity rests upon disputed questions of fact the invalidating facts must be proved to the satisfaction of the courts."

And again, at page 16, this Court says:

"The jurisdiction which is invoked here ought, as has been said, to be exercised only in the clearest cases. If a company of this kind chooses to decline to ob-

serve an ordinance of this nature and prefers rather to go into court with the claim that the ordinance is unconstitutional, it must be prepared to show to the satisfaction of the court that the ordinance would necessarily be so confiscatory in its effect as to violate the Constitution of the United States. In Ex parte Young, 209 U. S. 123, the last word of caution by this Court was said (p. 166):

'Finally it is objected that the necessary result of upholding this suit in the Circuit Court will be to draw to the lower Federal courts a great flood of litigation of this character, where one Federal judge would have it in his power to enjoin proceedings by state officials to enforce the legislative acts of the State, either by criminal or civil actions. To this it may be answered, in the first place, that no injunction ought to be granted unless in a case reasonably free from doubt. We think such rule is, and will be, followed by all the judges of the Federal courts.'

The same thought, in effect, was expressed in San Diego Land & Town Co. vs. National City, 174 U. S. 739, 754:

'Judicial interference should never occur unless the case presents clearly and beyond doubt, such a flagrant attack upon the rights of property under the guise of regulations as to compel the court to say

that the rates prescribed will necessarily have the effect to deny just compensation for private property taken for the public use.'

And in San Diego Land & Town Co. vs. Jasper, 189 U. S. 439, after repeating with approval this language, it was said (p. 441):

'In a case like this we do not feel bound to re-examine and weigh all the evidence, although we have done so, or to proceed according to our independent opinion as to what were proper rates. It is enough if we cannot say that it was impossible for a fair-minded board to come to the result which was reached.'

It cannot be doubted that in a clear case of confiscation it is the right and duty of the court to annul the law. Thus in Reagan vs. Farmers Loan & Trust Co., 154 U. S. 362, where the property was worth more than its capitalization, and upon the admitted facts the rates prescribed would not pay one-half the interest on the bonded debt; in Covington, etc. Turnpike Co. vs. Sandford, 164 U. S. 578, where the rates prescribed would not even pay operating expenses; in Smyth vs. Ames, 169 U. S. 466, where the rates prescribed left substantially nothing over operating expenses and cost of service; and in Ex parte Young, *supra*, where, on the aspect of the case which was before the court, it was not disputed that the rates prescribed were in fact confiscatory, injunctions were severally sustained.

But the case before us is not a case of this kind. Upon any aspect of the evidence the company is certain to obtain a substantial net revenue under the operation of the ordinance. The net income, in any event, would be substantially 6%, or 4% after an allowance of 2% for depreciation. See Stanislaus County vs. San Joaquin Company, 192 U. S. 201. We cannot know clearly that the revenue would not much exceed that return. We do not feel called upon to determine whether a demonstrated reduction of income to that point would or would not amount to confiscation. Where the case rests,, as it does here, not upon observation of the actual operation under the ordinance, but upon speculation as to its effect, based upon the operations of a prior fiscal year, we will not guess whether the substantial return certain to be earned would lack something of the return which would save the effect of the ordinance from confiscation. It is enough that the whole case leaves us in grave doubt. The valuation of the property was an estimate and is greatly disputed. The expense account was not agreed upon. The ordinance had not actually been put into operation; the inferences were based upon the operations of the preceding year; and the conclusion of the court below rested upon that most unsatisfactory evidence, the testimony of expert witnesses employed by the parties. The city authorities acted in

good faith, and they tried without success to obtain from the company a statement of its property, capitalization and earnings.

The courts, in clear cases, ought not to hesitate to arrest the operation of a confiscatory law, but they ought to refrain from interfering in cases of any other kind. Regulation of public service corporations, which perform their duties under conditions of necessary monopoly will occur with greater and greater frequency as time goes on. It is a delicate and dangerous function, and ought to be exercised with a keen sense of justice on the part of the regulating body, met by a frank disclosure on the part of the company to be regulated. The courts ought not to bear the whole burden of saving property from confiscation, though they will not be found wanting where the proof is clear."

In the Legal Tender cases, reported in 12 Wallace at page 531, this Court spoke as follows:

"An act of the legislature is not to be declared void unless the violation of the Constitution is so manifest as to leave no room for reasonable doubt."

In the case of Soon Hing vs. Crowley, 113 U. S., at page 710, the Court said:

"Courts will not inquire into the motives of legislators in enacting laws, except as they are disclosed on the face of the acts,

> or be inferable from their operations. The motives of legislators considered as to the purposes they had in view, will always be presumed to be to accomplish that which flows as the natural and reasonable effect of their enactment."

In the case of Chicago, Milwaukee & St. Paul vs. Tomkins, 176 U. S., at page 173, the Court said:

> "Upon any company seeking to challenge the validity of legislation rests the burden of proof that it infringes the constitional guarantee of protection to property. The case must be clear on behalf of the railway company or the legislation of the state must be upheld. Such being unquestionably the law, it is obviously of the utmost importance that the facts should be clearly and accurately found, * * * and that those facts shall sustain the conclusion reached."

The case of *San Diego Water Co. vs. San Diego*, 118 Cal. 556, is a rate making case which has attracted much attention. It has been frequently cited by this Court, and on this subject Judge Garoutte of the California Court, in the opinion of the Court, said (p. 581):

> "This court is not here to declare what are reasonable rates. The constitution has vested that power and duty in the Council of the City of San Diego, and the exercise of that power by the Council cannot be questioned by the courts unless constitutional rights are violated.

The question is not what rate this court would fix if the duty were cast upon it, of fixing rates. But, rather, will the owners of the plant be deprived of constitutional rights by an enforcement of the order of the Council fixing rates? If the rates fixed by a municipal council were twice too large, I know not what jurisdiction of the court could be invoked to right the wrong. Hence it is apparent that it is only in exceptional cases that an order fixing rates may be set aside by judicial decree. Taking the findings of fact as they stand, the schedule of rates fixed by the city should not be disturbed. The valuation of the plant is $750,000. The operating and current expenses are $40,000. The revenue from the sale of water under the schedule would be and actually was $65,000. This leaves a profit of $25,000 upon the investment. To be sure, it is not enough, and possibly not one-half the sum that could be earned in other business undertakings. But with these things we have nothing to do.

These are matters passed upon by the City in the exercise of a discretion granted by the constitution, and its decision as to the reasonableness of the amount of revenue to be derived by the company from the rates is conclusive upon the courts. While this sum is not enough upon this character of investment, still it is 3½%, and such return is a substantial profit. We mean it is so

substantial that a court of equity, in view of the law of the land, cannot say that the rates are so unreasonable as to be confiscatory in character, and thus violative of any principle of constitutional law. Mr. Justice Brewer, of the Supreme Court of the United States, has probably given this question more thought and investigation than any other jurist in this country, and he says in Chicago & N. W. R. Co. vs. Dey, 35 Fed. 866, 1 L. R. A. 744: 'Counsel for complainant urge that the lowest rate the legislature may establish must be such as will secure to the owners of the railroad property a profit on their investment at least equal to the lowest current rate of interest, say three per cent. Decisions of the Supreme Court seem to forbid such a limit to the power of the legislature in respect to that which they apparently recognize as a right of the owners of the railroad property to some reward; and the right of judicial interference exists only when the schedule of rates established will fail to secure to the owners of the property some compensation or income from their investment. As to the amount of such compensation, if some compensation or reward is in fact secured, the legislature is the sole judge.'

Subsequently the same question was again presented to him in Reagan vs. Farmers Loan & Trust Co., 154 U. S. 362, and also

> in Ames vs. Union Pacific R. Co., 64 Fed. 165, and in those cases neither he nor any other of the Justices of the Supreme Court retreated or advanced from that position."

And Mr. Justice Temple, in a special concurring opinion, said (p. 586):

> "The only proper judicial question is, whether compensating rates have been fixed. Whether they are too high or too low is not a judicial question. The judge cannot substitute his judgment for that of the body to whom the discretion is given by the constitution."

See also Minnesota rate cases, 230 U. S. 352, 433.

Many quotations might be made from numerous cases to the same general effect. They all speak strongly to the proposition that it is only in the clearest cases that courts will exercise their extraordinary powers to set aside the action of legislative bodies fixing rates.

Courts do not sit as rate making bodies, but when cases such as this case come before them, they are to determine only whether the rate complained of is manifestly a confiscation of property.

In theory, at least, courts have no control over legislative action except when the legislature has invaded rights guaranteed by our written constitutions. Within proper limits, the duties and responsibilities of the legislative branch of our government are as sacred as the duties imposed upon the judicial department, and while the courts will not shrink

from the performance of their duty when that duty is made clear, they certainly ought not to act unless the necessities of the case, the preservation of the rights of individuals, actually demand the exercise of the extraordinary powers which the American people have thus far been willing to entrust to the courts.

This leads to a discussion of the next feature of this case, which (for want of a better term) we have designated "Burden and Extent of Proof Required."

II.

Burden and Extent of Proof Required.

The cases cited in the preceding section express clearly the reluctance, indeed the entire unwillingness of the courts to substitute their judgment for the judgment of the legislature in determining what constitutes a fair rate of return, and the courts have made it clear that nothing short of confiscation of private property will induce them to intervene.

It is not enough that the rate of return may *prima facie* be inadequate. It must be established to the satisfaction of the court that the rates fixed by a legislature will result in confiscation. In other words, it is unquestionably the duty of a public utility asserting that its property is being confiscated to establish that fact in such a way as not to leave the matter open to any reasonable question; indeed, as the Master states in his report in this case, "beyond reasonable doubt." Particularly is this the case where the ordinance or statute, the enforcement of

which it is charged would result in confiscation, has never been actually put in operation, and where the result is dependent upon speculation.

This Court in the Knoxville case (212 U. S. 1) has taken pains to call attention to the danger of permitting a mere appraisement of the value of property made by experts, or alleged experts, to be used as a basis for the overturning of a legislative act, and in the case of *Chicago vs. Wellman*, 143 U. S. 345, one of the very earliest of the rate cases to come before this Court, Mr. Justice Brewer sounded a warning against the danger of courts being misled in matters of this character, which has not been and probably never will be disregarded.

> Chicago etc. Co. vs. Wellman, 143 U. S. 339, 342.

The valuation of a public utility for rate making purposes must necessarily consist of the examination of a variety of complicated elements, and each of these elements should be and ought to be established by convincing evidence. Otherwise, the ultimate determination becomes in effect valueless.

The complainant in such a case as this ought to establish the value of its plant, and to do this it must show the value of each item of property making up this plant; that is to say, its lands, its water rights, if any, its structures, and if the company is entitled to any allowance for intangible values those values should also be established by evidence which is not only preponderating, but such as will convince. Not only this, but it must show that the method by which the valuation of each of these items is reached is a proper and fair method.

It ought to disclose the amount of the gross return it receives, and it ought to show that such return is efficiently and economically collected, for by no other means is it possible to determine what return would be received from the investment under the ordinance.

It ought to establish what its expenses will be under the ordinance or statute if its operations are conducted in an efficient and economical manner, and on this phase of the question a mere showing of what its expenses have actually been, unaccompanied by any proof that these expenses were necessary, reasonable or proper, or even what they were for, goes but a little way toward establishing what its fair return is.

It ought to show that the rate of return which it receives will not merely be lower than the customary interest charge for moneys loaned in the vicinity, or lower than the usual return to similar public utilities in the same community, but that it will result in an actual deprivation of property.

And a failure to establish this leaves no basis for the conclusion that the ordinance is invalid.

It is a cardinal principle that courts are always entitled to the *best evidence*, and whenever a utility has direct or positive evidence as to some item of its expenditure or cost of construction, or original cost price, and substitutes therefor opinion evidence, it fails to sustain the burden cast upon it.

Of course, valuation is generally a matter of opinion, but the court, and not the witnesses, should

draw the conclusion, and where a public utility discloses to its expert witnesses items of cost in order that they may draw deductions therefrom as to the value of property, and fails to present the same evidence to the court which hears the testimony, that constitutes a failure on the part of the utility to sustain the burden cast upon it.

It is not fair for a utility which has figures showing the actual cost of construction of any element of its plant to disclose those facts to the expert witness it employs and withhold them from the court.

It is true that the cost of reproduction of a structure may not be equivalent to the original cost of that structure built at some past time, but surely nothing is more illuminating or persuasive in determining reproduction cost than a disclosure of the actual cost. With that for a guide, the court may then determine the reproduction cost, taking into consideration the advance or decline in the value of the elements and materials and the cost of labor; and surely such a determination would be more satisfactory than the estimate of what an engineer, no matter how capable, *thinks* the cost of reproduction might be.

It may be said that almost no evidence, except opinion evidence, was introduced by the complainant in this case, and for that reason the Court ought to be loath, as was suggested in the Knoxville case, to overturn legislative action on such evidence.

The evidence given by the witnesses Metcalf and Anderson, called by complainant, seems to have controlled the finding of the Special Master to a

large extent. Throughout his report he repeatedly asserts that in various particulars he has followed the testimony of the witness Metcalf or Anderson, or both, in preference to all other witnesses.

One of these witnesses states in his testimony (fol. 381, p. 279), that the original cost of the property of the company cannot be ascertained. If this applies to the property of the company as a whole, undoubtedly the witness is correct, but in the course of his further examination by Mr. Patterson, it appears that this witness made extensive use of the cost of various items of the plant when the same were available in determining his reproduction cost of the various structures. These, the witness says, were used by him as an aid to judgment. He says:

> "We gave great weight to the original contract and original cost of Lake Cheesman" (fol. 388, p. 285).

So that these items at least were available, yet we search the record in vain for any statement of what they were.

The witness Metcalf says that generally the construction cost could be segregated from the records of the company in order to apply it to particular items, but adds,

> "We got in the aggregate what were reported as construction cost of different parts of the plant since 1895."

Would not even this information have been an aid to the Court's judgment just as it was an aid to the judgment of the engineers? Yet, again we search the record in vain for this bit of information.

It seems hardly conceivable that the Company could have had no records of cost of the different units of its plant which were complete enough to give the Court aid in determining the value of these various elements.

Whatever may be the explanation, virtually no testimony was produced along the line we have stated. The Company was content to rest on the opinion of the expert witnesses which it had employed, and if that expert testimony leaves in the mind of the Court the same doubt which existed in the Court's mind at the time the decision was rendered in the Knoxville case, again it may fairly be said that the Company has not sustained the burden thrown upon it, and that the presumption which always exists in favor of the validity of legislative action should prevail.

III.

Fair Value of Complainant's Plant and Property.

The first thing to be considered in determining the fair rate of return is the value of the plant and property of complainant necessarily used in furnishing water to Denver and its inhabitants.

The Master found this value to be $13,415,899.00, and in his report has tabulated at page 122 of the record the various items making up this total valuation.

Following is a reproduction of said tabulation:

TABLE I.

	Class Nov. 1st, 1913	1 Fair contract cost, new.	2 Gross reproduction cost, including 12½% for engineering and contingencies.	3 Actual accrued depreciation.	4 Present reasonable value.
A.	Lands	.....	.....	.....	$ 637,814
B.	Water Rights	.....	.....	.....	2,947,617
C.	Lake Cheesman Division	$1,000,000	$1,125,000	$ 26,775	1,089,225
D.	Intake Platte Canon	56,089	63,100	814	62,286
E.	Raw Water Conduits	429,925	483,666	5,614	478,052
F.	South Platte Canon Division	523,737	589,204	68,040	521,164
G.	Raw Water Conduits and Filter	107,790	121,264	47,254	74,010
H.	Clear Water Conduits	962,012	1,082,263	182,102	900,161
I.	Bear Creek Division	395,361	444,781	48,213	396,568
J.	Littleton and Wynetka	34,190	38,464	6,399	32,065
K.	Bear Creek Division Conduits	325,021	365,648	13,360	352,288
L.	Cherry Creek Division	108,373	121,920	5,999	115,921
M.	Mississippi Avenue Division	135,885	152,871	23,553	129,318
N.	West Denver Station	290,628	326,957	125,160	201,797
O.	Capitol Hill Division	279,171	314,067	54,125	259,942
P.	Ashland Avenue Station	194,138	218,405	98,450	119,955
Q.	University Park Station	24,444	27,500	3,451	24,049

R. Montclair Booster Station.....	3,403	3,828	892	2,936
S. Distribution Pipe System.....	3,500,000	3,937,500	490,000	3,447,500
T. Personal Property, Supplies, etc.	190,000	.....	15,314	174,686
Interest during Construction.....	805,000	.....	105,455	699,545
Going Concern Value.....	.....	.....	.....	800,000
Value Water Works Plant November 1st, 1913.....				$13,475,899
Deduct depreciation from November 1st, 1913, to May 1st, 1914, less additions.				60,000
Reasonable Value of Plant May 1st, 1914				$13,415,899

(a)

Water Rights.

The Master found that $2,947,617 was the present reasonable value of such water rights, and in his report on page 130 of the record divides these water rights into groups as follows:

Group 1, being items 1, 2, 3, 4, 13, 14, 15, 16, 17 and 21	$ 949,500
Item 5, Denver City Water Company and Item 6, Mississippi Street (with 21 and 22)	200,000
Item 7, Cherry Creek Galleries	66,000
Item 8, Platte Canon Filter Galleries	65,000
Item 9, Platte Canon 34-inch Conduit	24,730
Item 10, Platte Canon 40-inch Conduit	30,000
Item 11, Northern Colorado Irrigation Co.	1,250
Item 12, Lake Cheesman	1,611,117
	$2,947,617

The appellant in its assignments of error, paragraphs 6, 7, 8, 9, 10, 11, 12 and 13, has made specific assignments of error as to the water rights acquired by the Company by diversion from the natural stream and the application of the use thereof by the City of Denver and its inhabitants.

It will be seen by an examination of the record at the places therein referred to that there are two classes of water rights:

1st. One class which the Company has acquired by purchase from others who had previously applied the water to beneficial uses outside of the City of Denver; and,

2nd. Water rights which had been acquired by the Company by impounding and diverting waters and where the City and its inhabitants have made the beneficial use of such water.

The value of the second class, placed upon the waters thus beneficially applied by the City and its inhabitants is found by the Master to be approximately $2,000,000.

It may be conceded that where the Company has purchased water rights outside of the City that have been applied to a beneficial use outside the City, thereby completing the right as given by the Constitution of Colorado to the use of such water, the Company is entitled, in arriving at the value of its property, to include the reasonable value of these water rights.

It will hereafter be shown that under the Constitution and statutes of the State of Colorado and the interpretation of its courts upon these constitutional and statutory provisions, where a company diverts water from a natural stream and the water is put to beneficial use by others, the one putting the water to a beneficial use is the owner and proprietor of the water right, and the company simply acts in the capacity of a carrier for hire, delivering the property of the owner to its place of use.

Therefore those items at least contained in the Master's report just referred to, and designated by him as

> "Appropriations originally initiated by the Water Company or its predecessors" (Trans., pp. 127 *et seq.*)

and amounting to $1,998,117.00 should not be included in determining the value of the Company's property.

The claim will not be questioned that in the State of Colorado the right of the application of the waters of the State to beneficial use when acquired is a property right. But where this right is acquired by a user who applies it to the use to which it was dedicated by the State, and he acquires it through the agency of a carrier, in such case, under the constitution and laws of the State of Colorado and the decisions of its courts construing such constitutional and statutory provisions, the property right thus acquired is in the *user* and not in the public carrier.

Prior to the time that Colorado became a sovereign State and adopted its Constitution, the Supreme Court of the Territory had held that while principles of law are undoubtedly of universal application, some latitude must be allowed to meet the various conditions of life in different countries; and that in arid countries where it is necessary in order to propagate crops to resort to the artificial use of water as a means of securing such crops, the physical laws of nature, whenever such laws exert a controlling influence, must be taken into consideration.

Yunker vs. Nichols, 1 Colo. 551.

And commencing with the decision above referred to, the Supreme Court of the Territory, and afterward the Supreme Court of the State, abrogated the common law doctrine of riparian ownership, and uniformly held that in view of the fact that much greater good would be derived from diverting water from the stream and applying it to the soil, than to follow the riparian doctrine and permit the waters to run in the streams past the land of riparian owners "undiminished in quantity and unpolluted in quality."

In the early history of this country, the vast territory now included within the boundaries of the State of Colorado and other western States, was commonly known and designated on geographical maps as the "Colorado Desert." On its plains and mesas, with the exception of short native grasses, little vegetation was grown. But when the resourcefulness and ingenuity of the early settlers saw a means of aiding nature by artificially contributing the only element that was lacking, Colorado, as well as other western States, became important contributors to the agricultural and horticultural products of the country. Consequently the framers of the Constitution of the State, in dealing with this water question, and in order that this limited element should be made to serve as great a purpose as possible, provided that:

> "The water of every natural stream, not heretofore appropriated, within the State of Colorado, is hereby declared to be the property of the public, and the same is

dedicated to the use of the people of the State."

The right to divert any unappropriated water of any natural stream for beneficial use shall never be denied. Priority of appropriation shall give the better right as between those using water for the same purpose; but when the waters of any natural stream are not sufficient for the service of all those desiring the use of the same, those using the water for domestic purposes shall have preference over those claiming for any other purpose, and those using the water for agricultural purposes shall have preference over those using the same for manufacturing purposes."

Colo. Const. Art. XVI, Secs. 5 and 6.

The courts of the state have had occasion frequently to determine questions arising under these constitutional provisions, and it is submitted that since all rights existing and claimed in the cause now before this Court, have arisen since the adoption of the Colorado Constitution in 1876, the decisions of the Colorado courts, unless they conflict with the Federal constitution, are of great influence if not controlling of the situation.

These matters have been the subject of much thought on the part of text writers on the subject of water rights and irrigation. Mr. Wiel, author of "Water Rights in the Western States," 3d edition, 1908, at page 1235, says:

"The rule of the arid states is that the consumer from a ditch is, through the intermediate agency of the ditch, an appropriator from the natural stream from which the company's ditch heads. The water company is thus made merely a common carrier of water. • • •

The principle is that the right of the consumer is not merely a right of service (without any proprietory right in the water rights or water system), but is a proprietory right in the natural streams, as though the consumer had himself diverted the water from the natural source. The consumer *pro tanto* is the appropriator and proprietor of the water right, and the canal company but a common carrier, or agent."

In the case of *Thomas vs. Guiraud*, 6 Colo. 550, it is stated at page 533:

"The true test of appropriation of water is the successful application thereof to the beneficial use designed; and the method of diverting or carrying the same, or making such application, is immaterial."

It was further held in the Thomas case at page 532:

"The *locus* of its application does not in any way affect the doctrine; and a prior appropriator of water is entitled to it as against a subsequent settler upon the stream from which it is taken, although he carries

it over an intervening divide and uses it to cultivate lands adjacent to another stream."

To the same effect is the case of *Coffin vs. Left Hand Ditch Company*, 6 Colo. 443, where it is held (at p. 444):

> "The right to water acquired by prior appropriation is not in any way dependent upon the *locus* of its application to the beneficial use designed."

Another text writer has defined the rule as laid down by the Supreme Court of Colorado as follows:

> "The courts of Colorado were the first to advance the theory that an incorporated company organized for the purpose of furnishing water to others than to its stockholders for profit or hire, was merely the carrier of the water, sometimes analogous to what is known in law as a common carrier, and that the consumers of the water or persons to whom the company sold or rented the rights to the use of water, and who actually applied the same to the beneficial use or purpose, were the appropriators of the water, in whom the title to the water rights was vested."
>
> Kinney on Irrigation and Water Rights, 2nd edition, Sec. 1476, p. 2652.

Later at page 2655 of the same work Mr. Kinney says:

> "The Colorado rule of treating the consumer as the appropriator and the owner

of the water rights, and the corporation merely as a carrier of the water has been followed in other jurisdictions."

It was in 1887 that the Colorado Supreme Court first announced clearly and unequivocally the status of a mere carrier of water, in the case of *Wheeler vs. Northern Colorado Irrigation Company*, 10 Colo. 582. We quote from page 587, opinion by Justice Helm:

"We shall presently see that after appropriation the title to this water, save perhaps as to the limited quantity that may be actually flowing in the consumer's ditch or lateral, remains in the general public, while the paramount right to its use, unless forfeited, continues in the appropriator. But to constitute a legal appropriation, the water diverted must be applied within a reasonable time to some beneficial use. That is to say, the diversion ripens into a valid appropriation only when the water is utilized by the consumer; though the priority of such appropriation may date, proper diligence having been used, from the commencement of the canal or ditch.

The constitution unquestionably contemplates and sanctions the business of transporting water for hire from natural streams to distant consumers. The Colorado doctrines of ownership and appropriation (as declared in the constitution, statutes and decisions), necessarily give the carrier of water an exceptional status; a status dif-

fering in some particulars from that of the ordinary carrier. Certain peculiar rights are acquired in connection with the water diverted. It is unnecessary now, however, to enumerate these rights in detail. For the present, it suffices to say that they are dependent for their birth and continued existence, upon the use made by the consumer.

But giving these rights all due significance, I cannot consent to the proposition that the carrier becomes a 'Proprietor' of the water diverted.

A cursory reading of the statutes might convey the impression that the legislature regarded the carrier as possessing a saleable interest in this water. And the constitutional phrase 'to be charged for the use of water' relating to the carrier's compensation, might at first glance seem to recognize a like ownership in such use. But construing all the provisions of that instrument bearing upon the subject *in pari materia*, the doctrine of both these inferences must be denied."

In further declaration of the law of Colorado in its application to the ownership of water rights, and as showing that the only method of owning or acquiring a water right is by actual use of the water for beneficial purposes, the following is declared in the case of *Combs vs. Agricultural Ditch Company*, 17 Colo. 150:

"Those who construct ditches and divert water for general purposes of irrigation, must within a reasonable time apply the water to beneficial use; or else, upon proper application, and for proper consideration, they must dispose of the same to those who are ready to make beneficial use of it. If ditch companies are unwilling to be charged with such duties and responsibilities, they must leave the water in the natural stream. The mere diversion of the water is not an appropriation of it within the meaning of the constitution; there must be an application of the water to beneficial use within a reasonable time or the diversion is unlawful. See Farmers High Line C. & R. Co. vs. Southworth, 13 Colo. 111, and cases there cited.

In a carefully considered opinion recently delivered by Mr. Justice Hayt in the case of Strickler vs. City of Colorado Springs, 16 Colo. 61, this court held that a 'priority to the use of water for irrigation is a property right and may be sold and transferred separately from the land in connection with which the right ripened.'

It must not be inferred from this language that such priority may be secured by the mere acquisition of stock in an irrigating company without applying the water to beneficial use. An owner of irrigating stock cannot thus carry prior rights to the use of

> water in his pocket for an indefinite or unreasonable time, and thereby prevent others from acquiring a bona fide priority by actual use.
>
> The ownership of a prior right to the use of water is essentially different from the ownership of stock in an irrigating company. The ownership of the stock, like the title to other property, may be acquired by descent or purchase; the ownership of a prior right can be acquired originally only by the actual beneficial use of the water. The very birth and life of a prior right to the use of water is actual *user*."

The above is the law of Colorado, and by the decisions above quoted the rights of ditch companies (carriers) are fully explained. The ditch company is given the right to divert water from natural streams for the purpose of irrigating lands belonging to its stockholders, and to others whose lands are so situated as to be irrigable from the canal or conduit. The mere diversion, however, of water from a natural stream, of itself vests no rights of ownership in the company or its stockholders. The diversion is simply the initiation of a right which to be completed must be followed by the application of the water to one of the beneficial uses recognized by the constitution. Of course, the ditch company, using water on its own lands, or for its own "beneficial uses," diverted by it from a natural stream, becomes the owner of such water, not because of the diversion but because of the use; and this right is a property

right, and has been held in Colorado to be a freehold. If instead of applying the water thus diverted to beneficial uses of its own, this company supplies the water to others, the diverting and carrying company then becomes a carrier for hire, or an agency similar to a common carrier. It is then entitled to collect a reasonable charge for diverting and carrying the water from the stream to the place where it may be applied by another to a beneficial use.

This general principle is stated in the case of *Farmers Highline Canal Co. vs. Southworth*, 13 Colo. 111 (at p. 114), where it is said:

> "It is well established that no mere diversion of water from a stream will constitute the constitutional appropriation. To make it such it must be applied to some beneficial use, and in case of irrigation it must be actually applied to the land before the appropriation is complete."

And in a specially concurring opinion at page 120 Justice Helm puts it this way:

> "If the consumer applies water to a beneficial use within a reasonable time after the carrier's diversion, the appropriation relates for its priority back to such diversion. This proposition was in effect announced in Wheeler vs. Irrigation Co., supra. It is substantially a re-statement of the uncontroverted doctrine that the appropriator's right, proper diligence being employed, dates from the beginning of his ditch. There may of course be secondary

diversions (to which the rights of secondary consumers relate) through subsequent lawful enlargements of the quantity of water legally taken in the first instance. And I do not say that the legislature may not fix a reasonable period within which use must follow diversion in order to constitute a valid appropriation.

The foregoing view is not a recognition of ownership in the carrier, save of its canal; nor does it in the slightest manner detract from the consumer's constitutional right of user. The carrier in and of itself has no independent priority (though the irrigation statutes use language that might give this impression), and any rights it may hold in connection with the water diverted depend for their continuance upon the use made by consumers. The carrier becomes the consumer's agent, and its labors clearly inure to his benefit. By taking from its canal the consumer recognizes and ratifies its acts of construction and diversion, making them his own. *And the situation, so far as this question is concerned, is not different from what it would have been had the consumer in fact employed the carrier to construct the canal for himself alone.*" (Italics are ours.)

Only once has any appellate court of Colorado departed from this doctrine. In the case of *Wyatt et al vs. Larimer & Weld Irrigation Co. et al,* 1 Colo. App. 480, the Court of Appeals held that the canal

company was not a common carrier, and that the consumer was not an appropriator, and that the canal company was an appropriator as between it and the consumer. But this case was taken to the Supreme Court of this State on appeal, and was reversed on appeal, 18 Colo. 298. At page 307 the Supreme Court said:

> "The plaintiffs allege a right to have a certain quantity of water flow through the irrigation company's ditch. This right is an easement in the ditch. It is a right annexed to realty, and being a perpetual right, is an incorporeal hereditament descendable by inheritance to plaintiff's heirs, and hence a freehold estate.
>
> The subject matter of the action is the estate. The acts threatened by defendants will, if carried out, materially diminish this estate and permanently depreciate the value of the water rights.
>
> The object of the action being to enjoin or prevent diminution, or in other words, to preserve the estate of the plaintiffs, the necessary result of the decree will be, one party will gain and the other lose a material portion of such estate. The action, therefore, relates to a freehold, and this court under the statutory provisions above cited, has jurisdiction to review the judgment of the Court of Appeals.
>
> The decision of the Court of Appeals in this case was rendered by a divided court.

> We are unable to see wherein the discussion by the learned judge writing the majority opinion touching the constitutional status of irrigation companies in this state was essential to the decision of the questions involved in the case. But inasmuch as the views expressed in that opinion are so at variance with numerous decisions of this court, we feel impelled to express our disapproval thereof, and our adherence to the doctrine of canal companies organized for the purpose of carrying water for general purposes of irrigation. We adhere to the doctrine that such a canal company is not the proprietor of the water diverted by it, but that 'it must be regarded as an intermediate agency existing for the purpose of aiding consumers in the exercise of their constitutional rights, as well as a private enterprise prosecuted for the benefit of its owners. Wheeler vs. N. C. Irr. Co., 10 Colo. 582; Farmers H. L. C. & R. Co. vs. Southworth, 13 Colo. 111; Strickler vs. City of Colo. Springs, 16 Colo. 61; Combs vs. Agricultural D. Co., 17 Colo. 146."

Upon rehearing the Supreme Court at page 315, said:

> "That a valid appropriation of water from a natural stream constitutes an easement in that stream, and that such easement is an incorporeal hereditament, the appropriation being in perpetuity, cannot well be

disputed. Washburn in his work on Easements and Servitudes, in discussing the question of property in water, at page 276 says:

'As forming the subject of property in connection with the realty, water may be viewed in two lights—one as constituting one of the elements of which an estate is composed, and giving by its qualities and susceptibilities of use, a value to such estate; the other, as being valuable alone for its use, to be enjoyed in connection with the occupation of the soil. In the latter sense, it constitutes an incorporeal hereditament, to which the term easement is applied.'

Angell on Water Courses, Sec. 141, uses this illustration:

'If a miller, or manufacturer, purchases the land itself over which the water runs, it is evident he would then have a corporeal tenement, and the right which he would possess, in respect to his water course would be real; but if he should purchase a water privilege, or a portion of water power, without any part of the bed of the river, he, in that case, would gain an incorporeal hereditament, or easement.'

The right acquired to water by an appropriator under our system, is of the same character as that defined by the foregoing authorities as an incorporeal hereditament and easement. The consumer under a ditch

possesses a like property. He is an appropriator from the natural stream, through the intermediate agency of the ditch, and has a right to have the quantity of water so appropriated flow in the natural stream and through the ditch for his use."

Another case, and one which we have heretofore referred to, which illustrates the rule in Colorado that the right to the use of water is dependable upon the application rather than to diversion and carriage, is *Thomas vs. Guiraud et al*, 6 Colo. 530, where at page 533 the court says:

"If a dam or contrivance of any kind will suffice to turn water from the stream and moisten the lands sought to be cultivated, it is sufficient, though no ditch is needed or constructed. Or if land be rendered productive by the natural overflow of the water thereon, without the aid of any appliances whatever, the cultivation of such land by means of the water so naturally moistening the same is a sufficient appropriation of such water, or so much thereof as is reasonably necessary for such use. The true test of the appropriation of water is the successful application thereof to the beneficial use designed; and the method of diverting or carrying the same, or making such application, is immaterial."

This matter is again considered by the Colorado Supreme Court in *Wright vs. Platte Valley Irrigation Company*, 27 Colo. 322. We quote from page 329:

"It is true, as has been frequently announced by this court, that a ditch company is not the owner of the water it diverts through its ditch; neither is its status, in the strict legal sense of the term, that of a 'common carrier'. As was said in *Wheeler vs. Northern Colorado Irrigation Co.*, 10 Colo. 582:

'The carrier must be regarded as an intermediate agency existing for the purpose of aiding consumers in the exercise of their constitutional right, as well as a private enterprise prosecuted for the benefit of its owners.'

Its status is more like that of a private carrier, whose duties are measured by the obligations it assumes toward its consumers, and such as the law imposes by reason of the nature of the business in which it is engaged. While it may not impose conditions that operate to deprive consumers of the enjoyment of their constitutional rights, it may require them to exercise such rights under reasonable regulations and limitations. The consumer, by reason of his application of the water to a beneficial use, is said to be an appropriator, yet we do not think he occupies the exact status of one who appropriates the water directly from the public stream. *His contract with the company is not the purchase of a given volume of water, but the purchase of the right to use the canal as a means to conduct a given volume, or so much*

thereof as may be necessary to irrigate a certain number of acres.'' (Italics ours.)

This question is important here because the Master in his report has disposed of it as follows (trans., p. 129):

> ''Where the unappropriated water of a natural stream is diverted and carried to the place of use by one and applied to a beneficial use by another, the 'appropriation' is in Colorado 'perfected'. The ownership of the 'appropriation' under such circumstances, is or may be fixed by contract between the one who diverts and the one who beneficially applies such water. It is plain that such parties by contract between themselves may vest the ownership of the appropriation in whom they please. This I understand to be the rule adopted by the Supreme Court of Colorado in City of Denver vs. Brown, 56 Colo. 216.
>
> The application of this rule to the facts of this case, places the ownership of these water rights in the Water Company. There is no testimony in the voluminous record accompanying this report, from which it can be fairly inferred that any consumer of the Water Company at the time he paid his water rates and received his license, believed or claimed he was making an appropriation of the water of a natural stream of Colorado or was acquiring as against the Water Company any right of any nature to

the use of water except as stated in that license.

I find that these water rights are owned by the Water Company."

The Master's conclusion is erroneous because:

1st: No contract for vesting the ownership of water in the Denver Union Water Company ever existed between that company and the users of water.

2nd: The Brown case, referred to by the Master, does not establish the rule,

"that such parties by contract between themselves may vest the ownership of the appropriation in whom they please."

This case, *City of Denver vs. Brown*, 56 Colo. 216, is of such importance that a somewhat extended quotation from it is justifiable. We accordingly quote therefrom beginning at page 222:

"The original company was organized to divert and carry water for mechanical, agricultural, mining and city purposes, but so far as any question is involved in this case with respect to the priorities awarded it, we think it and its successors in interest, so far as the rights of the individual consumers are involved, must be treated as an irrigation canal company carrying water for hire. Such a company is a quasi-public carrier for the purpose of conveying water from natural streams to places where it may be applied to a beneficial use.

> It is not the proprietor of the water which it is entitled to divert, but must be regarded as an intermediate agency existing for the purpose of aiding consumers in the exercise of their rights to apropriate water, as well as a private enterprise prosecuted for its benefit. Farmers I. D. Co. vs. Agricultural D. Co., 22 Colo. 513, 45 Pac. 444, 55 Am. St. Rep. 149; Wright vs. Platte Valley Irr. Co., 27 Colo. 322, 61 Pac. 603; Wheeler vs. No. Colo. Irr. Co., 10 Colo. 582, 17 Pac. 487, 3 Am. St. Rep. 603; Wyatt vs. Larimer & Weld Co., 18 Colo. 298, 33 Pac. 144, 36 Am. St. Rep. 280.

And again at page 224 the Court says:

> "As previously noted, the object of a carrier company is two-fold, namely: To aid consumers in obtaining water, and for its private gain. When a mere contract consumer severs his relation with the carrier, the latter is not required, for that reason alone, to permit the volume which it had theretofore diverted from the stream for the benefit of the consumer to remain in the source of supply. If the rule were otherwise, and a contract consumer became an appropriator from the river, in the full meaning of that term, as held by the trial court, then the carrier would be compelled to await the pleasure of the contract consumer with respect to the use of water after once contracting

with him, and its revenues would be dependent upon his whim, while others in the interim would be deprived of the use of the volume which the prior contract consumer had once utilized, but had ceased to use. The law does not permit such unjust and anomalous results to grow out of the relation of carrier and simple contract users.

The priorities awarded a carrier ditch are for the benefit of those entitled to use the water which they represent. This means those who are entitled to be supplied with water from the ditch, to which the priorities are awarded. When these rights are evidenced by a contract between the consumer and carrier for a specified volume for a specified period, the obligation assumed by the carrier is to deliver that volume for the period and purpose named in the contract. That is all the consumer contracted for. Such a contract is in no sense illegal or against public policy, and the consumer will not be heard to say that his contract conferred greater or different rights than those specified, save and except that having once become a contract user, he will be entitled to continue the relation from year to year thereafter, without intermission, however, unless limited in the exercise of this right by a valid provision in his contract, upon tender annually of a lawful rate of carriage, and compliance with the reasonable regulations of the carrier.

The rights of the contract consumer as thus defined, afford full protection to all. When the consumer's contractual relations with the carrier are severed, the obligations of the carrier are ended, and the consumer cannot complain because the rights of others have intervened by contract with the carrier for the use of water. That is their right, when the carrier has water undisposed of; and if it refuses the requests of bona fide applicants, it can be compelled to comply with their needs to the extent it has water which it can lawfully control.

If a mere contract user becomes an unqualified appropriator of water from the river supplying a carrier ditch, then certainly he ought to be required to compensate the carrier for the carriage of water, whether he is using it or not; and yet, we apprehend that when his contract expired, if the carrier should undertake to exact such compensation, his complete defense would be that his contract did not impose any such an obligation. The unjust results which would follow in ruling that a mere contract user is an unqualified appropriator make it apparent that his right is limited by the terms of his contract, so far as valid, and that when he voluntarily ceases at the expiration of his contract, to exercise his right to continue his contractual relations with the carrier, or preserve the status growing

> out of that relation, that his future rights only date from the time he again contracts with the carrier for water, or makes a demand to be supplied with water in circumstances with which the carrier is legally bound to comply."

Now it may be possible (though it is not conceded) that a consumer's right is forfeited by his failure to comply with the provisions of his contract with the carrier company, and that the carrier company is no longer required to carry the water for him. But it cannot be (and certainly is not stated in the Brown case, nor is it a fair inference to be drawn from the opinion) that in such a case the water company acquires the right to the water, for unless the water is again applied to a beneficial use by some other consumer, it must be left in the natural stream.

As was said in the case of *Wright vs. Platte Valley Irr. Co.*, 27 Colo. 322 at page 329:

> "His contract with the company is not the purchase of a given volume of water, but the purchase of the right to use the canal as a means to conduct a given volume or so much thereof as may be necessary to irrigate a certain number of acres."

It is true that the complainant in dealing with the inhabitants of the City and County of Denver, to whom it brought water for their consumption, required under its regulations that the consumer make an application for the use of water, and issued a li-

cense to the consumer authorizing him to use water. This, however, is for the purpose of safeguarding the rights of the carrier, and is permissible in order that water may not be wasted where it is as precious as it is in Denver. In no way can it be held that in making this application and receiving such license, the user becomes any less the appropriator of water than he was before.

The Water Company has the right to safeguard its interests in various ways. It may demand that its services be paid for in advance. It may adopt and enforce rules for conserving the water, and impose a penalty for the violation of such rules to the extent of depriving the consumer of the right of service. But the fact that the carrier is given these rights, does not vest the ownership of the water in the company in case the consumer discontinues its use, nor is his right to the use of water forfeited by non-compliance with the company's rules. The Water Company is not the appropriator of water which it is entitled to divert, "It is an intermediate agency for the purpose of aiding consumers in their appropriation of water as well as a private enterprise carried on for its own benefit."

All this is clearly shown by a reading of the case of City of Denver vs. Brown, supra.

When a railroad company undertakes to transport goods for a shipper, it has the right to promulgate and enforce rules with reference to the commodities handled, and to require the performance of certain obligations on the part of the shipper. It may require the payment of shipping charges in ad-

vance. It may require that the goods be removed from the railroad company's property at the point of destination within a reasonable time; and in case these requirements are not observed it may impose reasonable penalties. But it cannot become the owner of the commodities handled merely because the shipper fails to comply with these rules, or even abandons the commodities.

The owner of water and water rights in Colorado, then, is the *user* of the water, or rather the actual user of the water is the owner of the water and water rights.

The relation existing between Denver and the Water Company is entirely different from that existing between a city and public service corporation of a different character. In the case of Lighting Companies, or Street Car Companies, for example, the municipality simply gives the utility company a license or franchise authorizing it to use the streets and alleys of the city so that the company's product or service may be furnished to its patrons. Other means of lighting or transportation are available; but such is not the case with a water supply. In the circumstances that exist in the case now under consideration, the Water Company has and must have a monopoly for supplying Denver and its people an absolute necessity of life. The municipality may provide for furnishing this necessity by constructing and operating a municipal plant, or it may contract with carriers for that purpose.

The original charter of the City of Denver, established by the State Legislature in 1889, provided among other things:

"Fifty-seven. To provide the city with water, to erect hydrants and pumps, to construct cisterns, to provide and regulate water for irrigation purposes and other purposes; to regulate and provide for the construction of ditches, canals, conduits and gutters for conducting and distributing water through the city, and to keep the same in repair; and to acquire and own stock in any ditch company, the ditch of which supplies any part of the city with water for irrigating or domestic purposes; to regulate the use of water by the inhabitants of the city for irrigating the soil; to build and construct reservoirs for the storage of water and ditches outside of the city limits, for the purpose of bringing water from streams and such reservoirs into the city for the use of the inhabitants thereof, in such way and in such manner as shall be deemed for the best interests of the city, and to keep the same in repair; and to acquire, by purchase or condemnation proceedings, under the general laws of the state, water and ditch rights, and sites for parks and public buildings within the city, or between the city and the source from which the water is taken; and to such condemnation proceedings the possession of franchises by any water or ditch company shall be no bar upon the legal compensation being tendered and paid; to bore artesian wells for the purpose of obtaining water for the city at such

> places within or without the city as may be procured for that purpose, and prevent the wasting of artesian water from private wells; to construct or purchase water works for the use of the city; and to enlarge their capacity from time to time and keep the same in repair, and generally do whatever may be needful and necessary to be done in order to supply the city with water for fire, irrigating, domestic and other purposes, and regulate the same."

This was charter provision existing when the franchise of 1890 was granted.

This being the condition, Denver has full power and duty to furnish water for the municipality and its people. The municipality was merely representative, whether it should acquire a water system municipally owned, or whether other arrangements were made such as were made with the complainant.

The source of Denver's water supply is the South Fork of the South Platte River, and the principal means which the Denver Union Water Company and its predecessors have constructed and used under its contract with Denver are reservoirs, into some of which water is pumped, and into others of which water flows by gravity, together with proper conduits and distributing pipes. An important means of storage of this water, perhaps the most important which the complainant controls, is what is known as Cheesman Lake, constructed by The South Platte Canal & Reservoir Company heretofore mentioned.

By the law of Colorado any person or company desiring to divert water from a natural stream, or to secure reservoir rights for impounding water, is required to file a statement of his claim, setting forth in detail the particulars with reference to the amount of water expected to be diverted, the location of ditches and reservoir sites and the purposes for which the water is to be used.

In initiating the right to impound water in Cheesman Lake, the South Platte Company filed its statement of claim (Trans. p. 926 on map), in which among other things it states its claim as follows:

> "and also claims the right to use such stored water for domestic purposes in the City of Denver and along the lines of its mains and the mains of The Denver Union Water Company."

The laws of Colorado also provide that there shall be a judicial determination of the right to appropriate water and the date of the priority of the appropriation according to the facts of the case, and, the South Platte Company seeking an adjudication of its right, a decree was entered in the District Court of Park County (Trans. p. 919) fixing these rights with reference to Cheesman Lake. The court determined that the South Platte Company had leased its reservoir to The Denver Union Water Company, and since its organization has, at all times, afforded Denver and its inhabitants protection against fire and drouth; indeed the only water supply; and the court also found and decreed that

all the waters so impounded in Lake Cheesman are needed for the domestic purposes claimed (Trans. 923-4).

It will be seen, then, that both by the statement of claim, and by the decision of the court and the decree adjudicating the rights, all was predicated upon the needs of Denver and its inhabitants.

Neither the complainant, nor any of its predecessors, nor any of its subsidiaries, has ever used water, except in insignificant quantities, for any other purpose except the Denver water supply. No one of them has ever acquired a right in itself to the use of this water. No one of them has ever used it for its own purposes. All that has been done by these various companies is to secure the right of diversion and to conduct the water to the people who will use it. The only claim to an adjudication and a decree was, and necessarily must have been, predicated upon the use of the water by some one else—Denver—and since the water right under the Colorado Constitution and laws and decisions is in the *user* of the water, the municipality is the legal owner and the inhabitants are the equitable owners. A municipality, Denver, through its statutory authorization to acquire water for the benefit of its inhabitants has become the owner of these water rights, and the company of the works necessarily employed in furnishing this water. It is entitled to receive a fair remuneration for its capital employed, but it is entitled to nothing more. It certainly ought not to be allowed to predicate a right to make rates for service based on the charge that it is the owner

of the water or the water right, for these have always been owned, and must always be owned, by the municipality in trust for its inhabitants.

In concluding this topic, brief references will be made to two different rules laid down in the western states concerning the respective rights that exist between consumers of water and the carriers of water with whom the consumers deal.

Mr. Kinney in his work on Irrigation and Water Rights (2nd ed.), at Section 1475, says:

> * * * "Therefore, where the water is furnished and distributed to consumers by incorporated companies, there has arisen in the different states a considerable divergence of opinion between the authorities, as to the ownership of the title of the water rights. In Colorado, and in some of the other states following its rule, it is held that the title to the water rights is in the consumer, and that the company is merely the carrier of the water. While in other states it is held that the consumers' relation to the company is that of contract only; and that such consumers have no proprietary right in either the water rights or in the works necessary for the utilization of the same."
>
> See also Ibid. Sec. 1476.

And Mr. Kinney, in Section 1477, in discussing this relationship existing between the carrier and the consumer says that in the one case for the purpose of making the appropriation from the natural

stream, the corporation becomes the agent of the consumer in making such appropriation, and under the other rule the consumer becomes the agent of the corporation. The states in which the rule has been adopted adverse to that of Colorado are Idaho, Nevada, Oregon and California.

In the case of *San Joaquin vs. Stanislaus County*, 233 U. S. 454 (which was a rate case), it was held by this Court that the water rights were owned by the public utility company, and that in determining the value of the company's property for rate-making purposes these water rights should be included, and cites in support of such theory the case of *Palmer vs. Railroad Commission*, 167 Cal. 163, 138 Pac. 997.

By examination of the Palmer case just referred to, the rule in California will be readily distinguished from that in Colorado. The court in its opinion in the Palmer case, 167 Cal. at 173, says:

> "The proposition that the waters of a non-navigable stream are in the nature of private property and not property primarily devoted to public use is not only established by authority; it is demonstrable from well established principles of the law of real property. The right to the waters of a stream is real property, a part of the realty of the riparian lands originally, and a part of the realty as an appurtenance to any other lands to which it may be rightfully taken when the riparian rights have been divested in favor of the user on non-ri-

parian land. This was decided as early as Hill vs. Newman, 5 Cal. 446, 63 Am. Dec. 140, where the court said:

'The right to water must be treated in this state as it has always been treated, as a right running with the land, and as a corporeal privilege bestowed upon the occupier or appropriator of the soil, and as such has none of the characteristics of mere personality.' * * *.

Until some change is made in natural conditions, there is no existent right to the water of a stream, except that vested in the riparian owners. They alone can lawfully have access to the stream, and therefore they only, in a state of nature, may lawfully use it or divert it from the stream. Hence the right to the water of flowing streams in this state, prior to any sale or disposition of lands by the state or by the United States, was vested in the state or in the United States, not in their respective governmental capacities as sovereign and for the common use of the people, but as riparian owners in their respective capacities as landed proprietors. These rights were and still are strictly proprietary and in their nature private. When land was disposed of by either, the riparian water right pertaining thereto passed to the purchaser as a part of that realty. It necessarily remained a private right, since the sale did not have the effect

of dedicating it to public use. All these rights belong primarily to the riparian owners, consisting of the United States, the state, and the purchasers from one or the other of them. They cannot be divested from these riparian owners, and have not been divested from them except by their consent, expressed, as by statute, or by actual grant or contract, or implied as by prescription, or by enforced taking for public use, as by condemnation. It follows that they remain private property when they pass to purchasers, and that when they pass from the riparian owner to others by prescription, grant or consent, they do not by that transfer become impressed with any public use, and it still remains true that there must be a dedication to public use to divest the private right. They are no more public than is the land to which they belonged and of which they formed a part."

On petition for rehearing in the above case the court says:

"In a petition for rehearing the plaintiffs quote the opening clause of the amendment of April 8th, 1911 (St. 1911, page 821), to section 1410 of the Civil Code. This section formerly read as follows:

'The right to the use of running water flowing in a river or stream, or down a canyon or ravine may be acquired by appropriation.'

By the amendment this was prefaced by the following declaration:

> 'All water or the use of water within the State of California.'

This, it is claimed, is contrary to the doctrine declared and followed in the opinion of the court herein. This section was not cited in the briefs upon which the case was submitted. We refer to it now solely in order to show that it has no application to the case. All the water rights which were in dispute in the case arose and were acquired by and under appropriations made long before the passage of the amendment aforesaid. It ought not to be necessary to remind any one that a law of this character is not retroactive, or that it cannot operate to divest rights already vested at the time it was enacted."

There is a clear distinction between the Constitution of California and that of Colorado. The California Constitution, Article XIV, among other things provides:

> "Section 1. The use of all water now appropriated or that may hereafter be appropriated *for sale, rental or distribution,* is hereby declared to be a public use, and subject to the regulations and control of the state in the manner prescribed by law."

(Italics ours.) 233 U. S. at p. 460.

Whereas, in Colorado, it is provided by Section 5

of Article XVI that the water of every natural stream is the property of the public, and dedicated to the use of the people, subject to appropriation. And Section 6 of Art. XVI provided that the right to divert the unappropriated waters of any natural stream to beneficial uses shall never be denied. There is no authority in the Colorado Constitution to "appropriate (water) for sale."

Colorado, as shown in the decisions that have been referred to, has construed these sections to mean that the only manner of acquiring the right to the use of water is by the application thereof to a beneficial use, and there is no property in water except the use thereof. Whereas, in California, waters are declared to be for public use, to the end of regulation and control by the State; nevertheless the water may be appropriated for "sale, rental or distribution."

There being such a marked difference between the constitutions of these two States, and the decisions of the courts of the respective States interpreting these constitutional provisions and their various statutory provisions, the distinction is easily drawn.

(b)

Going Concern.

In determining the value of the property used by the Water Company in furnishing water to Denver and its inhabitants, the Master in his report included the item of "Going Concern," and valued it at $800,000.00, which he included in the aggregate

in making up his total estimate of valuation of the property of complainant (Trans., pp. 122-3).

The appellants objected and do object to this allowance or any part thereof, as not being a proper allowance in this kind of a case.

The Master, in explaining this element of value in his report, at page 137 of the transcript, says:

> "Such valuation of the entire property has been made precisely as if the plant were about to commence serving the public, with its business yet to be established.
>
> The plant is one 'where its business is established' and is 'an assembled and established plant doing business and earning money.' It follows that the 'element of value'—the 'property right'—going concern value, remains to be appraised."

There have been a large number of cases, both in this Court and in the Federal and State courts of the United States, in which the question of "Going Concern" was either decided or discussed, and at least in so far as rate cases are concerned, the holdings have been almost uniform that "Going Concern" is an element that should not be considered in determining the value of property for rate making purposes. The courts have not been harmonious as to the reasons for making the disallowance, principally for the reason that hardly any two cases stand upon the same basis.

The question of "Going Concern" will now be considered as applied to the facts and conditions of

this particular case. The complainant company has a monopoly in the business of furnishing water to the City and County of Denver. Denver is situated in an arid or semi-arid country, and water is a prime necessity to the inhabitants of the City. It is also a legal necessity by reason of sanitary laws which make it necessary for residents to use water.

The only difference in value between a water system which is completed and ready for use, and a system which is completed and being used, is the expense of inducing the consumers to take the water —in building up the trade. There is even a distinction between the furnishing of water to the inhabitants of a city, especially in an arid state or city, and gas, electricity or other public service which is not a prime and legal necessity. Electricity and gas are not necessities. Yet it has been held in cases which will hereafter be referred to, that even where a company has a monopoly of the business of furnishing gas or electricity, nothing should be added in a rate making case for "Going Concern."

Water in a Colorado city is as necessary as air. It costs a company nothing to build up a trade except merely the clerical expense of issuing licenses to those who will inevitably apply for the use of the water. And the issuance of the licenses is no more than an easy means of collection of the dues owing to a public service company. The complainant Company issues these licenses twice yearly, and obviously for the purpose of being able to collect promptly its dues for service.

Suppose that tomorrow the City were to build a new system, or a new company were to build a new system, connecting the mains with the consumers' service pipes, and then suppose that the old company were to cease doing business without transferring its licenses and contracts, or its *good will*, to the new company, how long would it take the new company to build up the business and how much would the effort cost?

To ask this question is sufficient to show that this so-called "Going Concern" value, particularly in a case of this kind, has no support, but is purely mythical and exists only in the fond hopes of the corporate mind desirous of enlarging assets upon which to predicate a rate of income in keeping with its ideas as to the amount of return it should receive.

However the Master may have arrived at this amount of $800,000.00, it is plainly, indeed avowedly, adding to the valuation of the plant for rate making purposes this very substantial sum which is due to the single fact that the people who pay the rates have added this valuation to the actual value of the property.

Or to put it another way: The Denver Union Water Company has no customer except Denver and its inhabitants. It has no business except with Denver and its inhabitants. Whatever "business value" the plant has, call it "going concern value" or what you will, is the value of its business with Denver. Now to charge to the people of Denver, in addition to a fair rate on the actual value of the plant, an added return based on the business which Denver people

give to the Water Company, is to charge against the inhabitants of Denver, as something on which they should pay a return, an element which they themselves have created. In other words, it is asking the inhabitants of Denver to pay interest on what they themselves own.

In *Spring Valley Water Company vs. City and County of San Francisco*, 165 Fed. 657, at page 695, it is said:

> "The value of the franchise and going business depends upon their earning power. Their earning power depends on the rates, and the rates at the present time are regulated by the board of supervisors."

In the case of *Smyth vs. Ames*, 169 U. S. 466, the court, at p. 547 said:

> "What the company is entitled to ask is a fair return upon the value of that which it employs for the public's convenience."

The foregoing case was cited with approval and followed in *San Diego Land & Town Co. vs. National City*, 174 U. S. 739, and in *San Diego vs. Jasper*, 189 U. S. 439, and in neither of these cases was the item of "Going Concern" value allowed.

In the case of *Brunswick Water District vs. Maine Water Company*, 99 Me. 371, an unusually well considered and frequently cited case, the Court in its opinion, at p. 376, said:

> "As a structure it has value independent of any use or right to use where it is—a value probably much less than it cost, unless it can be used where it is * * * we speak

sometimes of a going concern value as if it is or could be separate and distinct from structure value—so much for structure and so much for going concern. But this is not an accurate statement. The going concern part of it has no existence except as a characteristic of the structure. If no structure, no going concern. If a structure in use, it is a structure whose value is affected by the fact that it is in use. There is only one value. It is the value of the structure as being used. That is all there is of it." (Citing Kennebec Water District vs. Waterville, 97 Me. 185.)

In the case of Spring Valley Company vs. San Francisco, 165 Fed. 667, the court, at p. 695 said:

"The plant is operated under a franchise, a legal right to collect water rates is more valuable than without such a right; and a plant with an established business, with customers who have connected their houses with the company's distributing pipes, is more valuable than it would be without such connections, and without such customers. These facts, as well as all other discoverable elements of value, should be weighed, but it must be remembered that while the rate fixing agency is in duty bound to establish rates which will afford a reasonable compensation for the use of this plant at a fair valuation as affected by the fact that it is a going business and operated un-

der its franchise, there is no duty to go beyond this and confer an additional value for these intangible elements, which is neither discoverable nor apparent."

And in a case between the same parties, Spring Valley Company vs. San Francisco, 192 Fed. 137, the court, at p. 167, said:

> "Probably nothing further is needed to demonstrate for this case at least, the utter futility of attempting to establish a separate and distinct valuation for a going business. * * * I shall consider the fact that complainant has an established business, not by fixing a definite value therefor, but along the lines suggested by the sound and practical utterances of Judge Savage in Brunswick Water District vs. Maine Water Company, 99 Me. 371, 376."

See also Contra Costa Water Company vs. Oakland, 159 Cal. 323, 113 Pac. 668, in which case "Going Concern" value was not allowed.

In the case of *Cedar Rapids Water Co. vs. Cedar Rapids,* 118 Iowa 234, the item of "Going Concern" value was disallowed. The court in its opinion, at p. 262, said:

> "It is proper here to say that in reaching these conclusions we have not attempted any estimate of the 'going value' of the water works as a distinct and severable item in the calculation. By 'going value' we understand is meant that value which arises

from having an established 'going' business. While not the exact equivalent of 'goodwill' as applied to ordinary business, it is of a somewhat similar nature, and attaches to the business, rather than to the property employed in such business. The fact that the business is established is, of course, a material fact in ascertaining the value of the plant, and especially is this true where the property is being estimated for the purpose of sale or condemnation; but as a basis for estimating profits its signification is less apparent. The merchant who sells an established business may properly place a high value on the goodwill which he relinquishes to the buyer; but so long as he continues in the enjoyment of the business he has created he does not add the value of the goodwill to his capital stock in estimating the percentage of his annual profits. So, also, we may say we see no reason why plaintiff, in addition to operating expenses, repairs and other ordinary charges, should be allowed to reduce the apparent profits by deductions for a restoration or rebuilding fund. The setting aside of such a fund may be good business policy, and, if the company sees fit to devote a portion of its profits to that purpose (though as we understand the record, no such fund has yet been created), no one can complain, but it is in no just sense a charge affecting the net earnings of the works. To hold otherwise

is to say that the public must not only pay the reasonable and fair value of the services rendered, but must in addition pay the company the full value of its works every 40 years—the average period estimated by plaintiff—for all time to come."

In *Cedar Rapids Gas Light Co. vs. Cedar Rapids,* 144 Iowa 426, the court, at p. 434, said:

"The value of the plant is to be estimated in its entirety, rather than by the addition of estimates on its component parts, though the latter course will materially aid in determining the value, * * * The fact that the plant is in successful operation constitutes an element of value. As said, the value of the system as completed earning a present income, is the criterion. * * * Save as above indicated, the element of value designated a 'going concern' is but another name for goodwill, which is not to be taken into account in a case like this, *where the company is granted a monopoly.*"

The case just quoted from was sustained by this Court in 223 U. S. 655.

In the case of *Consolidated Gas Co. vs. New York,* 157 Fed. 849, the court, at p. 872, said:

"I cannot perceive how this complainant can possess a goodwill answering that description. There is nothing in the nature of its business enabling it to acquire goodwill in the proper sense, or indeed

> in any other. It is required by law to furnish gas, * * * and it owns the mains, service pipes and meters. What induces a customer to remain with this company, its successor or vendee? Nothing that I can imagine except a desire to avoid the nuisance of street digging in front of his house. * * * Yet even this nuisance is in all human probability impossible of occurrence because of the beneficially monopolistic character of defendant's present occupancy of the streets of the city, * * * and I think it apparent that conceivable goodwill of a gas company in this city is about equal to that of the street cleaning department of the municipal government."

The decision of the court in the case just referred to in disallowing the claim for "Going Concern" or "Goodwill" came to this Court as *Willcox vs. Consolidated Gas Co.*, 212 U. S. 19, and the lower court's conclusion on this point was affirmed.

The witnesses in the case at bar in arriving at their estimates of value of the various properties owned by the water company, must have considered such valuation from the standpoint of a going concern. The witnesses practically agreed that the *scrap value* of the property would not exceed $6,000,000 (Trans., pp. 229-231), and therefore any value above its scrap value must be the value attributed by reason of the plant being in operation and earning money. The various reservoirs, conduits and distributing pipes are all valuable because they are

so situated that water can be furnished to consumers. Without this fortunate situs of the property, the property is of little value unless it could be employed for some other like or similar purpose, and it must therefore be assumed that the witnesses in testifying as to the value, testified as to a live concern rather than as to a dead one.

Furthermore, the Master in arriving at the value of complainant's property, took for a basis the cost of reproduction less depreciation. This is one of the methods recognized by courts and those scientifically familiar with the subject. However, this is no more than a medium in arriving at valuation for rate making purposes. The test, and the only true test, is the actual value of the plant, and the reproduction cost is only one means of arriving at this true test. This particular phase of our argument will again be discussed under the head of "depreciation," but at present we wish to call the attention of the Court to this feature under the head of "Going Concern."

In the case of *New York Trust Company vs. City and County of Denver*, 229 U. S. 123, this Court held, referring to this same water system, that the City and County of Denver was under no obligation to purchase the system from the company, or to renew the franchise of the company, but that it had complete authority to build an independent plant and to require the present plant to be removed from service.

It is, therefore, to say the least, questionable if the Master adopted the proper method of arriving at the value of complainant's property for the reason

that in view of the fact that the company's franchise had expired and it was furnishing water to the City of Denver and its inhabitants purely by sufferance. Therefore the cost of reproduction is not a fair method for determining the value of complainant's property. It is certain by reason of foregoing that the item of "Going Concern" should not have been added to the cost of reproduction.

In the case of *Appleton Water Works Co. vs. Railroad Commission*, 154 Wis. 121, which was one involving the appraisal of a water company which the city was purchasing under the provisions of the indeterminate franchise law of Wisconsin, the court with reference to the question of "Going Concern" at page 148 said:

> "However, the fundamental difficulty with the attempt to set a definite sum as the measure of going value, is that it is an attempt to divide a thing which is in its nature practically indivisible * * * It is not obtained by adding up a number of separate items, but by taking a comprehensive view of each and all the elements of the property, tangible and intangible, including property rights, and considering them all, not as separate things, but as inseparable parts of one harmonious entity, and exercising the judgment as to the value of that entity. In this way the going value goes into the final result, but it would be difficult for even an expert to say how many dollars of the result represent it."

In the case of *Cumberland T. & T. Co. vs. City of Louisville,* 187 Fed., 637 at 646, the court said:

> "It is insisted that $50,000 should have been included in the estimate as a distinct and additional enhancement of the value of the plant because of the fact that the company is a going concern. In valuing property of the character of that involved here it would indeed be looking only to the "bare bones" not to take into consideration the fact that the company is a going concern. That fact, however, though possibly somewhat unconsciously to themselves, must necessarily, we think, have been taken into account by the witnesses who testified as to values. Property underground or overhead, thinly strung out over many miles, would have very diminished value were it not in actual use for the purpose for which it was installed. The matter does not appear to have been passed upon in the report, nor, while it is argued in the brief, does any exception appear to be based on this phase of the case, but we have concluded that this element of value would hardly be susceptible of accurate measurement by and of itself, and we shall consider the fact to be that it was an inherent factor in the estimate made by each witness who testified as to values."

In the case of *Des Moines Gas Company vs. City of Des Moines,* 199 Fed. 204, the special master in chancery, Judge Robert Sloan, in passing upon the question of "Going Value" said:

"It also renders it extremely doubtful that 'going value' will be included in valuation of such a plant as the basis of return beyond the fact that it is in 'successful operation.' That would exclude the sum of $300,000 estimated in this case, on the grounds that *when the ordinance was enacted*, it already possessed a well developed and paying business.

In my judgment, after considering the able and thorough arguments of counsel, that it is decisive of the question, and holds that "going value" should not be considered in determining the basis upon which the complainant is entitled to have its return reckoned, and feel that it is my duty to so state.

The physical value as hereinabove determined, is reckoned upon the fact that the plant was in 'successful operation' when the ordinance was enacted, otherwise its value would be much less. The "going value" is that enhancement which results from a well developed and paying business. This would result in reducing the estimated deficits for each year $24,000, and yield a return to the complainant of at least six per cent on $2,100,000." 238 U. S. 170.

The foregoing excerpt from Judge Sloan's decision as Master was affirmed by the District Court in the case above referred to.

This same case came to this Court in *Des Moines Co. vs. City of Des Moines,* 238 U. S. 153, 35 Sup. Ct. Rep. 811 (which was a rate case), in which the question of "Going Concern" was the principal question discussed in the opinion of the Court, the Master had refused to allow as an independent item the sum of $300,000 for "Going Concern." After an exhaustive review of the authorities, this Court sustained the action of the Master and held that while the element of value represented by "Going Concern is a property right and should be considered in determining the value of property, that nevertheless in view of the fact that overhead charges had been allowed in estimating the value of the property of this gas company, that nothing should be allowed for the item of "Going Concern," this court in its opinion, at page 171, saying:

> "As pointed out in the Cedar Rapids case, if return is to be regarded beyond that compensation which a public service corporation is entitled to earn upon the fair value of its property, the right to regulate is of no moment, and income to which the corporation is not entitled would become the basis of valuation in determining the rights of the public. When, as here, a long established and successful plant of this character is valued for rate making purposes, and the value of the property fixed as the Master certifies upon the basis of a plant in successful operation, and overhead charges have been allowed for the items and in the sums already stated, it cannot be said, in view of

> the facts in this case, that the element of going value has not been given the consideration it deserves, and the appellant's contention in this behalf is not sustained."

In the present case, the Master as we view it, has made an allowance for overhead charges which is more than enough to take care of any so-called "Going Concern." He states in his report (trans. fol. 210) that "Going Concern" value is the value which inures in a plant where its business is established, as distinguished from one which has yet to establish its business. And again at folio 212, page 138, of the record, he said:

> "There is no absolute standard by which the fair value of this element can be determined, and I adopt $800,000 because no matter how often I have considered the evidence and the arguments, my mind always comes back to this amount as reasonable and fair to all parties."

There are approximately 40,000 service pipes in the City of Denver, and at the rate allowed by the Master about $20.00 each is allowed for getting the inhabitants of the city to take something that they have to take, and something which would not cost the company an extra $1.00 of expense; and while there are various misunderstandings as to the meaning of the term "Going Concern" the Master here has placed his meaning on the term clearly, that it is the *cost of establishing the business after the plant is fully completed.*

(c)

Overhead Charges and Interest During Construction.

The Master in his report, after allowing "fair contract cost new" for the structures composing the plant, allowed an additional amount of 12½ per cent for "engineering and contingencies," which amounts to $1,046,272. He also allowed $805,000 for "interest during construction." He also found that the total structural value of the property—that is, the contract price new of such structures—to be $8,370,167; this, of course, without allowance for depreciation. This question of an allowance for engineering and contingencies has been the subject of a wide range of discussion; but assuming that the proper method of arriving at fair value is the cost of reproduction less depreciation, it is no doubt proper in some cases to make an additional allowance for engineering and contingencies of some character. However, this case differs from a large number of cases we have examined on this same question, in this: The Master takes first the *contract* cost new of the structures, whereas in most of the cases, as we view it, the *cost of material and labor* has been taken as the basis and to this has been added a percentage for engineering and contingencies. Des Moines Gas Co. vs. Des Moines, 238 U. S. 153-166. There is also a distinction in determining overhead charges in a system such as this, which naturally constructs its works by piece-meal, and a company that has to complete its whole plant before it commences to earn money. This plant has been in process of construction since

1870. The original outlay was comparatively small as compared with the additions and extensions that have accrued from the time the plant was first started. As the city has grown, new conduits have been necessary, new reservoirs have been necessary, and these have been built as needed. Also the distributing systm is extended as new additions are laid out and as new demands are made for water, and necessarily this item of engineering and contingencies, which would be allowed in the construction of a plant that had to be wholly completed before it could be used, would be taken care of by operating expenses. A company, after it commences to construct a water plant, has an office force organized, it has its engineers, all paid out of the operating expenses of the company, and it is difficult to see how a definite basis can be assumed upon which to predicate this item. As was said by Judge Evans in the case of Cumberland Telephone and Telegraph Company vs. City of Louisville, 187 Fed. 637 at 646-7 the Court said:

> "First, what are called 'overhead charges,' which are made up of various items of expenses incurred in the organization of the company and its work, the details of which need not be stated, but which it is claimed could not be avoided, and which enter, as is insisted, into the present value of the plant. These charges amounted to $90,000.
>
> 'Overhead charges' consist of expenses much of which were incurred long ago.

> Probably those expenses may have aided very materially in increasing the present value of the plant. That present value we must ascertain, *but it does not follow that 'overhead charges' as a separate item should be included as such. It seems to us that they are too intangible to be available for that purpose.''* (Italics ours.)

Much that has been said with reference to this item of engineering and contingencies may also be said of the item of interest during construction. It might be considered that an allowance for interest during construction is proper, if it is shown that the money expended for structures is lying idle during the construction, but there is no basis here for computing any such interest. The Master bases this interest item on the money expended for the structure, but in arriving at the value of the structures he uses contract cost new as the method. If the company is to pay for these structures by contract price, and the structures are to be turned over to the company when completed, why the item of interest during construction? Let us illustrate, from the Master's return, the unreasonableness of both of these charges. He has given the contract price new, of the distribution pipe system as three million and a half, to this he has added 12½ per cent for engineering and contingencies and the pro rata share of the item of interest during construction. This pipe system, as said before, has been put in as the demands of consumers required it. Whatever engineering, or any other contingencies, would be expended as operating expenses.

It must furthermore be borne in mind that both of these items were predicated upon evidence of witnesses basing their opinions entirely upon estimates, and in the language of the Court in the Cumberland Telephone and Telegraph Company vs. City of Louisville case, supra, "It seems to us that they are too intangible to be available for that purpose."

It also appears that there has been a duplication of allowance, as in the case of *Des Moines Gas Co. vs. Des Moines*, 238 U. S. 153; at page 166, the Court defined "overhead charges" and enumerated thereunder seven different classes of charges, one of which is "interest during construction." All of the seven items included under "overhead charges" amounted to only 15 per cent upon the base value of the property exclusive of real estate, except a small item for organization expenses.

Whereas in this case the two items of "interest during construction" and "overhead charges" amount to $1,846,272.00, or 22.9 per cent of the contract price of the structures as found by the Special Master, and adding to this the sum of $800,000.00 found by the Master for "Going Concern" (which item of "Going Concern" was rejected in the Des Moines case just cited), would increase the percentage to over 32 per cent upon said structural cost. This is not only surprising, but to those uninitiated and unfamiliar with rate expert's resourcefulness is astonishing.

(d)

General Considerations.

Under this general topic of fair value, we have only so far discussed those items which appear to us as subject to legal objections, viz: water rights, going concern values, estimates for engineering and contingencies, and interest during construction; and we now wish to give briefly a general consideration to the methods used by the Master in arriving at the value of the other property involved. The Master says (Transcript, p. 121): "Lands and water rights are appraised at their present market value. Estimates of the cost of reproduction of the structures are made, and from such estimated reproduction cost deductions for accrued depreciation are made, so as to determine the estimated reasonable value of the structures in their present condition."

Assuming for the present that the reproduction method was a proper method for arriving at the fair value of the property, the only evidence upon which the Master had to arrive at his conclusions, was the evidence given by the experts, and the evidence of these experts based, not upon known facts, but upon *estimates*. It would be hard to conceive of a more unreliable way to determine facts, notwithstanding the rule is that these facts must be established clearly and beyond a reasonable doubt. There were five witnesses who testified for the complainant, basing their testimony as experts upon estimates as to the reasonable value of the entire plant. These witnesses were Freeman, Hazen, Metcalf, Anderson and

Holman (Master's Report, p. 138, transcript). Their testimony varied from $15,300,000, the lowest, to $16,614,719, the highest, or a difference between the highest and lowest of more than $1,300,000. There were two witnesses who testified for the defendants as to the cost of the reproduction of the structures of this plant, one was John Gaffy, who testified that he would undertake to reproduce the system for $10,109,789 (Transcript, p. 690). This of course was without any allowance for depreciation or interest during construction. The witness Bickel (p. 755, transcript) estimated the cost of reproduction, including promotion and executive expenses, at $9,915,388, and this also without deducting anything for depreciation or interest during construction. The last two witnesses named did not take into consideration the value of the water rights. It will therefore be seen that there is a range of over five million dollars in the estimates of the witnesses. True, the witnesses for complainant preponderated, but no doubt had the City deemed it advisable to employ enough experts, its witnesses would have preponderated. The witnesses for the City were both practical contractors, and while neither of them had undertaken as large a project as this, they were familiar with all of the matters necessary to be taken into consideration in arriving at the value of the plant, or rather, the cost of reproducing the same.

We realize full well that weight should be accorded to the findings of the Master upon matters involving questions of fact, where there is a material conflict in the testimony; but here the Master arrived at his conclusions, not from disputed questions of

fact related by witnesses, but upon various indefinite estimates which amounted to not much more than guesses.

The burden is upon the company to show the value of its property and to show it by satisfactory evidence, in order that the Court may be convinced before it will be authorized to set aside the act of a legislative body. There was an immense amount of testimony introduced in this case, and there are various discrepancies between the witnesses as to various elements in the case, but we think it would serve no good purpose to prolong this phase of the argument. We have pointed out some of the prominent characteristic features of the wide discrepancies of evidence for the purpose of illustrating the unsatisfactory showing made by the company in its endeavor to challenge the rate making body, and the evidence has wholly failed, leaving aside the evidence of the appellee, to establish matters with that clearness which courts demand in cases of this kind.

IV.

Depreciation.

The Master has charged against the income of the plant the sum of $140,000.00 as annual depreciation, and has added this to operating expenses and taxes, and then deducted the gross of these items from the gross revenue in order to arrive at what is called the net income of the complainant.

Evidently this $140,000.00 is allowed on the theory that it is a proper annual charge on this ac-

count. It is not clear just how this allowance for annual depreciation is arrived at, although it seems to be based on the testimony of the witness Hazen (Trans., p. 230).

There is much testimony in the record concerning the difference between the straight line method of depreciation and the sinking fund method, and which method the Master used in arriving at his conclusion is left wholly in doubt. But one thing is very evident, the future depreciation of the plant, if the Master has used the straight line method of depreciation, will continue the same, $140,000.00, or in excess of 1¾ per cent of the present revenue of the plant, including everything which is subject to depreciation, the same things taken into account by the Master as shown by his report; and if he used the sinking fund method of depreciation the future depreciation is each year to be larger than it was in the last preceding year by reason of the fact that compound interest will be added to the sum of $140,000.00 annually.

From a general view of the testimony it seems reasonable to say that the estimated life of the units, taking the average, will be fifty years from May 1, 1914. If the amount evidently included in operating expenses for repairs and renewals shall be continued in the future as in the past (and in the year ending October 31, 1914, this amount was in excess of $96,000). (See second tabulated statement following page 1080 of Transcript), there will certainly be some sort of a plant remaining at the end of whatever period may be fixed.

The Master, however, in determining the question of valuation, would seem to proceed on a different theory when he considers depreciation in the past as compared with the depreciation of the future. In determining the valuation of the plant on November 1, 1913, the Master made a deduction of actual accrued depreciation of $1,320,970.00 for the entire period of time beginning with the first construction or acquisition of any element or unit now going to make up the value of the plant, or a gross deduction of .1268 per cent. Calling the average age of these units on November 1, 1913, twenty years, this is an allowance of $66,048.50 annually, figuring by the straight line method of depreciation as distinguished from the sinking fund method of depreciation allowance, and if the sinking fund method were followed, the result of the annual allowance, of course, would be smaller at the beginning of this period and greater near its end. The Master then, for some reason, deducts $60,000.00 as depreciation for the six months from November 1, 1913, to May 1, 1914, which is practically double his allowance for previous depreciation, according to the above estimate (Trans., p. 122, Table 1).

Why the Master should have made an allowance for depreciation of $60,000.00 for a six-months period as against $66,048.50 *annual* depreciation theretofore, and why he should have placed the allowance for subsequent depreciation at $140,000.00 annually is a little difficult to understand.

Bearing in mind that the plant was begun in 1870, and every important unit except the Cheesman

dam had been installed and work on the Cheesman dam had been begun prior to 1897, an average age of 20 years would not seem unreasonable.

The witness in testifying regarding the sinking fund method of depreciation stated that this is an amount to be set aside annually, which, with interest at 4 per cent, compounded annually, will amount to the value of the plant at the end of the estimated period of its life. In other words, this allowance is to be figured so that at the end of the period there will be no plant and its full value will be provided for. Now $140,000.00 paid annually with interest at 4 per cent, compounded annually, will amount to $13,500,000.00 in about 39 years 7 months, while if we calculate what amount of money should be paid in annually so as to make $13,500,000.00 in 50 years, interest being calculated at 4 per cent, and compounded annually, we find that $85,028.00 so paid in annually would provide for this valuation.

Thirteen million, four hundred fifteen thousand, eight hundred ninety-nine dollars or $13,500,000.00 ought not in any event to be taken as the true value of the plant in estimating depreciation. The Master finds $13,415,899.00 to be the value of *everything* owned by the complainant, including water rights $2,947,617.00, lands $637,814.00, going concern value $800,000.00; a total of $4,385,431.00. If we deduct these items from $13,415,899.00, we have $8,030,468.00 as the value of all that could possibly be counted as subject to depreciation. One hundred forty thousand dollars annually with interest at 4 per cent, compounded annually, will amount to $8,000,000.00

in twenty-nine years. While if we calculate what amount of money should be paid in annually so as to make $8,000,000.00 in 50 years, with interest at 4 per cent, compounded annually, we find the sum of $50,386.00 so paid in will provide this valuation.

It should be noted that this 4 per cent interest allowance under the sinking fund method of determining depreciation is fixed by the witnesses for the complainant, and surely the complainant's estimate of what money is worth in these circumstances is at least persuasive in arriving at a determination of what would be a fair return on its investment under any schedule of rates; and if the complainant's estimate of the value of money when determining the amount which should be set aside to cover the depreciation in anticipation of the plant's total destruction is 4 per cent, and when, as is apparent, the schedule of rates complained of would yield a return much in excess of 4 per cent on the fair value of the investment, excluding water rights and excluding going concern value and excluding extravagant annual expenditures of money under the guise of operating expenses, the enforcement of the ordinance under consideration would not seem to be confiscation.

In the early part of Exhibit "C" appears a somewhat extended history of the business of the Water Company, in which is given the approximate date of the completion of the various units (Exhibit "C," pages 15-19), and it would appear that some of these units are quite old—for example, the South Platte Division, mentioned in the Master's Table

(page 122, Trans. of Rec.), was apparently completed in the year 1896—it is thus eighteen years old. The Master figures the reproduction cost of this unit at $589,204.00; he figures the accrued depreciation to date at $68,040. The percentage which the accrued depreciation bears to the reproduction cost is 0.115 and the annual depreciation would be 0.00638. The Cherry Creek Division would seem to have been completed, so far as can be ascertained from Exhibit "C," in 1887—it is twenty-seven years old. The Master fixes its reproduction cost at $121,920.00— he fixes depreciation to date at $5,999.00, or, in other words, at 0.049. For the period of its age the percentage of annual depreciation would be 0.0018. The Mississippi Division, the Master finds to be capable of being reproduced for $150,871.00 and to have depreciated up to the present time by the amount of $23,553.00. This division would seem to have been completed according to the statements in Exhibit "C," in 1884, its age is thirty years, accrued depreciation to date amounts to 0.154 and annual depreciation to date amounts to 0.0052.

Lake Cheesman is the newest large unit of the Company's plant, apparently completed in 1906, age eight years. The Master finds its reproduction cost to be $1,125,000.00. He finds depreciation to date to amount to $26,777.00, or a total accrued depreciation of 0.0237. Its annual depreciation during its age would amount to 0.0029.

We have examined the record with reference to a number of other units of the plant and subjected them to the same test, and in no case have we found

that the Master has allowed depreciation to date in the amount of 1¾ per cent per annum, or anything approaching this sum. Of course, we recognize that in making these calculations there may be errors, particularly in the date of the installation of the units. It is not improbable that the engineers who compiled the Water Company's Table which appears in Exhibit "C" at page 68 and following, were given more complete and detailed information concerning the age of the units than is ob tainable from the record, but, again, we must insist that the burden is upon the Company and that if the Company chooses to present instead of facts the testimony of engineers as to what they *estimate*, the Company is not sustaining the burden thrown upon it; this matter has already been discussed under the heading of Burden of Proof.

But why consider depreciation at all? If $96,-000.00 is expended annually for repairs and renewals, as was expended in 1914, and charged as operating expenses, is it conceivable that at the end of the plant's estimated life nothing of the plant will be left? Why should any such sum of money as $96,-000.00 be expended in a single year for repairing concrete dams, and repairing and replacing concrete conduits and wooden and iron pipes, except for the purpose of keeping the plant up to its present standard of adequacy and efficiency? Shall it be said that at the end of the period of life so estimated, the complainant shall have inhand in money the full value of theplant, and also own a plant such as will then be in existence and capable of furnishing Denver a sufficient water supply? If any such amount is to be

allowed on account of depreciation annually, then certainly some part of the amount expended for repairs and renewals should be deducted from the depreciation allowance, for it should be constantly borne in mind that the depreciation allowance which the witnesses discuss is intended to furnish an amount of money which, if placed at interest, will aggregate at the end of the plant's life its full value.

V.

GROSS RETURN AND OPERATING EXPENSES.

The Master at Section 49 of his Report (Trans.. p. 138) says:

> "I find that the Water Company's gross return for the year beginning May 1st, 1914, and ending April 30th, 1915, under the rates prescribed by Ordinance No. 26, Series of 1914, would have been $1,093,-615.45."

He does not state the basis of arriving at this gross return, nor how he computed it.

He does state that he adds the sum of $16,560.40 by reason of increased meter rates, but we assume from an examination of the record that he took the year 1914 as a basis for arriving at the gross returns of the complainant, as well as the basis for arriving at the operating expenses.

We submit that it was not proper to take the year 1914 as the basis of anticipating the gross returns of the company, or for anticipating its operat-

ing expenses, because by reference to Exhibit "A56" (Trans., p. 990), which contains a tabulation of the Company's gross earnings and operating expenses from the year 1895 to the year 1913, inclusive, and to Exhibit "C" (Trans., p. 1108) and Exhibit "D" (Trans., p. 1109), it will be seen that the gross earnings of the Company for the years 914 were $47,067.30 less than for the year 1913, and $48,341.66 less than for the year 1912.

It does not appear in the record why there should have been this great difference in gross returns in the year 1914 as compared with the years 1913 and 1912.

An examination of plaintiff's Exhibit "A-56" will show that there has been a steady increase in the gross earnings ever since 1895. The gross earnings in 1895 were $628,332.98, and they gradually increased until they have more than doubled, making an average annual increase of more than 5 per cent.

It is therefore absolutely unfair to the City to select that tabulation for the year 1914 as a basis of arriving at what the Company's gross earnings will be in the future. The only evidence we have in the record authenticating plaintiff's Exhibit "A-56" is that of the witness Thomas Cheyne (Trans., p. 347). He testified that Exhibit "A-56"

> "shows accurately the total gross earnings of the company for each year of the nineteen years,"

and this testimony of Mr. Cheyne and the exhibit itself is the only evidence in the record as to the gross earnings of the Company.

After having anticipated the future total gross earnings of the Company, the Master at paragraph 50 of his report (Trans., p. 139), estimates that the operating expenses for the period beginning May 1st, 1914, and ending April 30th, 1915, would be $347,845.00, but there is nothing in the record to justify this finding of the Master.

The complainant in its bill (Trans., p. 77) alleges that these operating expenses for the year mentioned would be $333,045.06. In other words, the Master has allowed as operating expenses, to be deducted from the gross earnings, $14,800.00 more than is claimed by the complainant Company. The only evidence in this record upon this question of estimating the operating expenses is that of the witness Thomas Cheyne, the accountant who prepared Exhibit "A-56," and he says (Trans., p. 347) that he estimates the expense for the year in question as $333,045.06, the identical amount claimed by complainant in its bill.

Had the Master taken the year 1912 as his basis for determining the rate of return, and used the valuation fixed by him on the plant of the Company, the rate of return would have been .0406 plus instead of .0364 plus; or had he taken the year 1913 the rate would have been .0374 plus.

As said before in this brief, it is encumbent upon the complainant in this case, not only to show fairly and clearly the value of the property employed by it in furnishing Denver with water, but it is also necessary for it to show the amount of its gross earnings and what it did with these earnings, and

this should be clearly and conclusively shown in order to justify this Court in interfering with an act of legislation.

In the case of *Chicago etc. Ry. Co. vs. Wellman,* 143 U. S. 339, Mr. Justice Brewer said at page 345:

> "It is agreed that the defendant's operating expenses for 1888 were $2,404,516.54. Of what do these operating expenses consist? Are they made up partially of extravagant salaries; fifty to one hundred thousand dollars to the President, and in like proportion to subordinate officers? Surely, before the courts are called upon to adjudge an act of the legislature fixing the maximum passenger rates for railroad companies to be unconstitutional, on the ground that its enforcement would prevent the stockholders from receiving any dividends on their investments, or the bondholders interest on their loans, they should be fully advised as to what is done with the receipts and earnings of the company; for if so advised, it might clearly appear that a prudent and honest management would, within the rates prescribed, secure to the bondholders their interest, and to the stockholders reasonable dividends. While the protection of vested rights of property is a supreme duty of the courts, it has not come to this, that the legislative power rests subservient to the discretion of any railroad corporation which may, by exorbitant and unreasonable

salaries, or in some other improper way, transfer its earnings into what it is pleased to call 'operating expenses.'

We do not mean to insinuate aught against the actual management of the affairs of this company. The silence of the record gives us no information and we have no knowledge outside thereof, and no suspicion of wrong. Our suggestion is only to indicate how easily courts may be misled into doing grievous wrong to the public, and how careful they should be to not declare legislative acts unconstitutional upon agreed and general statements, and without the fullest disclosure of all material facts."

See also:

Tucker vs. Missouri Pac. Ry. Co., 108 Pac. 89 (Kan.).

Wyman on Public Service Corporations, Sec. 1152.

Bearing this principle enunciated by Mr. Justice Brewer in mind, let us examine the record to see if we can of what these operating expenses consist.

The only evidence of operating expenses is contained in complainant's Exhibit "A-56" (Trans., p. 990), Exhibit "C"' (Trans., p. 1108) and Exhibit "D" (Trans., p. 1109), and the testimony of the witness Cheyne (Trans., p. 347), where this witness has but this to say:

"The items charged as operating expenses are in my judgment properly and fairly charged as such operating expenses,"

his reference being to Exhibit "A-56." This exhibit purports to contain a tabulation of operating expenses for the years 1895 to 1913, inclusive, and this exhibit, with the testimony of the witness Cheyne, is the only evidence offered by the Water Company on this important question of what the Company did with its money.

Exhibits "C" and "D" purport to give the operating expenses for the years 1913 and 1914. Taking these three exhibits, we will examine some of the items contained in the tabulation to see if they meet the requirements of the rule stated by Mr. Justice Brewer in the case just referred to.

The first item is "Pumping Works." In 1914 this is given as $68,702.67. No explanation is given as to the character of the expenditure, or as to what it was expended for, or as to why it was $15,000.00 more than for the year 1910 and $10,000.00 more than for the year 1912.

The next item is that of "Reservoirs." There is a charge of $42,700.46 in 1914; $25,814.14 in 1913, and $19,679.80 in 1910.

It is not stated whether it is for repairs of reservoirs, or what.

The next items is that of "Conduits"; $26,328.73 for 1914; $19,167.39 for 1913; and $13,168.20 for 1912. Whether this is for renewals or building of new conduits the evidence is silent. It is important to know this, because the Master has allowed the sum of $140,000.00 for annual depreciation, and the

Court should be able to determine from the evidence and not from the accountant's guess what these expenditures are for.

We will now pass down in the table to the item of "Office Expenses." In 1914 these were $81,-934.17; in 1913 they were $80,807.56; and in 1912 $67,482.10; and in 1911 and 1910 a little over $62,-000.00 for each year. Were these office expenses for exorbitant salaries? What did they consist of? Why should there be a difference of $19,000.00 between 1911 and 1914? The record shows that the Water Company furnished water to Denver in 1911 as much or more than in subsequent years. According to tables set out by complainant in its bill (Trans., p. 70) it furnished more water in 1910 and 1911 than it did in 1912 and 1913. The same identical works were employed in furnishing water to Denver in 1914 as in the years just preceding, therefore it becomes important to inquire whether this item of almost $82,000.00 of office expenses has been sufficiently explained to authorize this Court to allow this item as a proper expense of operation.

During the year 1914 there is charged in this tabulation for the item of "Stable Expenses" and "Stable and Auto Service" over $32,000.00; and in 1913 almost $30,000.00, with no explanation as to whether these services or any of them were required. It is hard to imagine how this large sum could have been expended for such service.

Mr. Justice Brewer in the Wellman case says that the Court should be fully advised as to what is done with the receipts and earnings of the company.

There is also an item of "Legal Expenses" for 1914, $31,597.00; in 1913 $45,716.00; in 1912 $34,-743.69; 1911, $39,348.14; and 1910, $33,453.95. But in 1909, the year preceding the time when the Water Company commenced its extensive litigation against the City and County of Denver, we find this sum for Legal Expenses is $16,503.29, and in 1908 $11,522.12.

While there is nothing in the record to show it, we have the right to assume that this more than doubling of legal expenses after litigation commenced with the City, was attributable to such litigation, and is not a proper charge against the City, notwithstanding that it may be a proper operating expense. Certainly the Water Company would not have the right to charge the City with money it expended in litigation with the City.

The last item we will refer to is the item of "General Expenses." In 1914 this is charged as $19,932.93; in 1913 $22,480.60; and in 1912 $20,575.10.

These general expenses may all be legitimate, but this Court, before it is asked to set aside and annul the acts of a legislative body fixing rates as confiscatory, should know what this money is being expended for.

This analysis with reference to the expenditure of money becomes important when viewed with reference to other matters in the case. The Master has allowed an annual depreciation of $140,000.00, which is allowed for the purpose of keeping the property of the Company in *statu quo*.

It is quite likely that a part of the items contained in the tabulation are items which have gone

to the repair of the Company's works, for replacements, betterments or extensions of its system; and how is this Court to know, unless the Company sees fit to be frank and explain, what these expenditures have been made for? It was certainly within the knowledge of the Company what these expenditures were made for, at least during the recent years of its existence, and inasmuch as it has not come forward and given this important information for the use of the City and the Court in determining this matter, it should be construed strongly against it.

It needs no argument to demonstrate the importance of this question of operating expenses. If $100,000.00 has been charged to operating expenses which is not a proper charge, this would make a difference of more than ¾ of one per cent upon the Company's income, even taking as a basis the sum of $13,415,899.00 found by the Master as the value of the property necessarily used.

VI.

RATE OF RETURN.

The Master found that the reasonable value of the plant on May 1, 1914, was $13,415,899; that the total annual operating expenses, taxes and depreciation was $604,795; he anticipated that the Company's earnings for the year ending April 30, 1915, would be $1,093,615.00, leaving the net earnings or return $488,820, and calculated that the rate of return on the value of the property, as found by him, would be .0364.

It has already been shown that the value of the plant as found by the Master was excessive, and was not justified by the evidence. It has already been shown that the operating expenses allowed by him were excessive, and that his estimate of the gross returns of the Company were too low; that the annual depreciation allowed was not in keeping with the depreciation that he charged against the reproduction of the plant. All of these matters will be taken into consideration in the discussion of this topic, but first we will consider, in the abstract, the general question of rate of return.

In the case of Reagan vs. Farmers' Loan & Trust Co., 154 U. S. 362, Justice Brewer said:

> "It is unnecessary to decide, and we do not wish to be understood as laying down an absolute rule, that in every case a failure to produce some profit to those who have invested their money in the building of a road is conclusive that the tariff is unjust or unreasonable."

Courts do not require the rates to be as high as rate making bodies may place them. The value of the services to the consumer must be considered, regardless of the value of the plant.

> Water District vs. Water Company, 99 Me. 371.

In the case of Minneapolis, St. Paul & Salt Ste. Marie R. R. Co. vs. Railroad Commission, 136 Wis. 146, 165; 116 N. W. 995, decided June 5, 1908, Justice Trimlin, in delivering the opinion, says:

"In reviewing the order of the Railroad Commission, the inqury is not whether the rate, regulation or service fixed by the commission is just and reasonable, but whether the order of the commission is unreasonable or unlawful. The nature of the inquiry is changed at this point and the court is not investigating for the purpose of establishing a fixed point. Whether or not the order is within the field of reasonableness, or outside of its boundaries, is the question for the court. It is quite a different question from that which was before the commission in this respect.

The order being found by the court to be such that reasonable men might well differ with respect to its correctness, cannot be said to be unreasonable. From this aspect, it is within the domain of reason, not outside of its boundaries. This is the viewpoint of the reviewing court."

The Supreme Court of California in the San Diego case, 118 Cal. 556, held that some margin over lowest rate of interest would not be unfair; and the Minnesota Supreme Court in the case of Steenerson vs. Great Northern Railway Co., 69 Minn. 353, held that 2½ per cent on terminals and 5 per cent on other property was not confiscatory.

In the case of Willcox vs. Consolidated Gas Company, 212 U. S. 19, the Court, at page 48 of the opinion, says:

"There is no particular rate of compensation which must in all cases and in all parts of the country be regarded as sufficient for capital invested in business enterprises. Such compensation must depend greatly upon circumstances and locality; among other things, the amount of risk in the business is a most important factor, as well as the locality where the business is conducted and the rate expected and usually realized there upon investments of a somewhat similar nature with regard to the risk attending them. There may be other matters which in some cases might also be properly taken into account in determining the rate which an investor might properly expect or hope to receive and which he would be entitled to without legislative interference. The less risk, the less right to any unusual returns upon the investments. One who invests his money in a business of a somewhat hazardous character is very properly held to have the right to a larger return without legislative interference, than can be obtained from an investment in Government bonds or other perfectly safe security. The man that invested in gas stock in 1823 had a right to look for and obtain, if possible, a much greater rate upon his investment than he who invested in such property in the city of New York years after the risk and danger involved had been almost entirely eliminated."

And in the same opinion at page 41, the court says:

> "The case must be a clear one before the courts ought to be asked to interfere with state legislation upon the subject of rates, especially before there has been any actual experience of the practical results of such rates. In this case the rates have not been enforced as yet, because the bill herein was filed and an injunction obtained restraining their enforcement before they came into actual operation."

And again on page 42:

> "Of course, there may be cases where the rate is so low, upon any reasonable basis of valuation, that there can be no just doubt as to its confiscatory nature, and in that event there should be no hesitation in so deciding and in enjoining its enforcement without waiting for the damage which must inevitably accompany the operation of the business under the objectionable rate. But where the rate complained of shows in any event a very narrow line of division between possible confiscation and proper regulation, as based upon the value of the property found by the court below, and the division depends upon opinions as to value, which differ considerably among the witnesses, and also upon the results in the future operating under the rate objected to, so that the material fact of value is left in much doubt, a court of equity ought not to inter-

fere by injunction before a fair trial has been made of continuing the business under that rate, and thus eliminating, as far as possible, the doubt arising from opinions as opposed to facts."

In the case of Knoxville v. Water Company, 212 U. S., 1, this court said at page 17:

"It cannot be doubted that in a clear case of confiscation it is the right and duty of the court to annul the law. Thus in Reagan v. Farmers' Loan & Trust Company, 154 U. S., 362, where the property was worth more than its capitalization, and upon the admitted facts the rates prescribed would not pay one-half the interest on the bonded debt; in Covington &c. Turnpike Co. v. Sandford, 164 U. S. 578, where the rates prescribed would not even pay operating expenses; in Smyth v. Ames, 169 U. S. 466, where the rates prescribed left substantially nothing over operating expenses and cost of service; and in Ex patre Young, supra, where, on the aspect of the case which was before the court, it was not disputed that the rates prescribed were in fact confiscatory, injunctions were severally sustained. But the case before us is not a case of this kind. Upon any aspect of the evidence the company is certain to obtain a substantial net revenue under the operation of the ordinance. The net income, in any event, would be substantially 6 per cent, or 4 per cent

after an allowance of 2 per cent for depreciation. See Stanislaus County v. San Joaquin Company, 192 U. S. 201. We cannot know clearly that the revenue would not much exceed that return. We do not feel called upon to determine whether a demonstrated reduction of income to that point would or would not amount to confiscation. Where the case rests, as it does here, not upon observation of the actual operation under the ordinance, but upon speculations as to its effect, based upon the operations of a prior fiscal year, we will not guess whether the substantial return certain to be earned would lack something of the return which would save the effect of the ordinance from confiscation. It is enough that the whole case leaves us in grave doubt. The valuation of the property was an estimate and is greatly disputed. The expense account was not agreed upon. The ordinance had not actually been put into operation; the inferences were based upon the operations of the preceeding year; and the conclusion of the court below rested upon that most unsatisfactory evidence, the testimony of expert witnesses employed by the parties."

The conditions in the present case are very similar indeed to the conditions in the Knoxville case and the Willcox case. There is here, as there, a large mass of testimony, consisting almost entirely of testimony of expert witnesses. The rates in the present

case have not yet been enforced, their enforcement has been enjoined and no actual trial has been had to see if the Company will not be able to operate under the rate fixed. The Master took the preceding year as a basis, as was done in the Knoxville case, the record in the present case also shows that the Company's business has rapidly increased ever since its organization.

In the case of Cedar Rapids Water Company vs. City of Cedar Rapids, 118 Ia. 234, the Court says at p. 263:

> "The net earnings upon this showing, if not large, are substantial. The Court cannot undertake to guaranty the company any fixed or certain return upon its investment. The exercise of such a power would work an utter destruction of the legislative right to regulate rates of water companies and other corporations operating works of public utility. We think the decisions have already gone to the verge of safety in nullifying legislative acts of this character; and to go further, and say that the courts will not only preserve property from confiscation and destruction by legislative power, but will also assure to its owners a definite and fixed rate of profit upon their investment, would be an act of judicial usurpation."

In determining the fair rate of return for an investment as large as this, the evidence of what banks charge for short-time loans of three months, or as to what rate of interest is charged for small

real estate loans, is not persuasive. The larger the amount of the investment, the smaller the return expected, and even the rate of .0364, as found by the Master, when the amount involved is taken into consideration, and the further fact that there is almost no hazard to be taken, is so close, at least, to a fair return, that it should not be disturbed. However, we think we have demonstrated that the Master and court below seriously erred in several particulars. There was an allowance of $1,988,177 for "water rights," which do not belong to the Company, also the sum of $800,000 for "going concern"; there was also an allowance of $1,046,272 for "engineering and contingencies," which should not have been allowed, and the sum of $805,000 for interest during construction, which, to say the least, is questionable. Then again, the Master took the year 1914 as his basis for arriving at the gross earnings of the Company and found them to be $1,093,615. Had he taken the year 1913, or even 1912, as the basis for determining such gross earnings, these gross earnings would have been increased by almost $40,000, which would have made them—taking into consideration this reduction of 20 per cent—$1,140,000. This is to say nothing of the difference in operating expenses in 1914, the year taken by the Master as a basis for his estimate, and the previous years.

Below follows tables showing the result of the above contentions.

TABLE SHOWING RATE OF RETURN BASED ON MASTER'S VALUATION, DEDUCTING VALUE OF WATER RIGHTS NOT PURCHASED, GOING CONCERN, ENGINEERING AND CONTINGENCIES, INTEREST DURING CONSTRUCTION, AND ADDING TO NET EARNINGS FOUND BY MASTER THE DIFFERENCE IN GROSS EARNINGS OF 1914 AND 1912 AND 1913.

Value of property by Master		$13,415,899	
Deduct:			
Water rights	$1,998,117		
Going concern	800,000		
Eng. and Cont.	1,046,272		
Int. Dur. Const.	805,000		
		4,649,389	
		$8,766,510	
Net earnings by Master			$488,820
Add for difference of earnings of 1912 and 1913 over 1914			40,000
			$528,820
Rate of return, .06+			

TABLE SHOWING RATE OF RETURN BASED ON THE VALUE OF PROPERTY AS FOUND BY MASTER, DEDUCTING WATER RIGHTS NOT PURCHASED, AND GOING CONCERN, AND ADDING TO NET EARNINGS BY MASTER, THE DIFFERENCE IN GROSS EARNINGS FOR 1914, AND 1912 AND 1913.

Value of property by Master	$13,415,899	Net earnings by Master	$488,820
Water rights	$1,998,117	Add for difference of earnings of 1912 and 1913 over 1914	40,000
Going concern	800,000		
	2,798,117		
	$10,627,782		$528,820

Rate of return, .0497+

TABLE SHOWING RATE OF RETURN BASED ON THE VALUE OF PROPERTY FOUND BY MASTER AND DEDUCTING WATER RIGHTS OTHER THAN PURCHASED WATER RIGHTS, AND ADDING TO NET EARNINGS, FOUND BY MASTER $40,000.

Value of property by Master	$13,415,899	Net earnings by Master	$488,820
Water rights	$1,998,117	Add for difference of earnings of 1912 and 1913 over 1914	40,000
	1,998,117		
	$11,417,782		$528,820

Rate of return, .046+

The foregoing tables are based on the face of the record. They do not take into consideration the apparently extravagant amounts charged for operating expenses, but do assume that the gross returns should have been found by the Master to be at least $40,000 more than he did find them. Neither do they take into consideration the conflict in testimony in regard to the value of the property; but it is simply sought to deduct from the Master's valuation those amounts to which there are strictly legal objections. As we have said before, if $100,000 too much has been charged to operating expenses, this would increase the rate of return more than ¾ of 1 per cent., and it is manifest that under this rate ordinance, taking a fair value of the property and giving full credit for the returns to the Company, a fair return will be realized.

Assuming that Denver continued to grow after 1914 at the same rate that it grew in the past, and assuming that the Company's increase in returns amounts to at least 5 per cent annually, is it wise to disturb this legislation until at least a fair opportunity can be afforded to determine whether or not the Company will receive a fair return? We only need to refer to two cases to determine this question, those cases are the Knoxville case and the Willcox case reported in the 212 United States Reports herein quoted from, to establish that the Master and the court below were in error.

VII.

CONCLUSION.

The function of rate making is purely legislative in character, whether exercised directly by the legislature itself or by some subordinate body. The courts will not arrest these legislative acts except in the clearest cases.

It therefore became the duty of the complainant to show by clear and convincing testimony that the act complained of was one that demands judicial interference. In other words, as said by this Court in *Knoxville vs. Water Company*, 212 U. S. 1:

> "The constitutional invalidity should be manifest, and where the invaldity rests upon disputed questions of fact the invalidating facts must be proved to the satisfaction of the court."

In determining whether or not the complainant has presented a case which comes within these requirements, the first thing to determine is the fair value of complainant's property. Exception has been taken to three different elements allowed by the Master in his report, viz: "Water Rights," "Going Concern," "Overhead Charges and Interest During Construction," and general considerations of the character of the testimony upon which the Master predicated his fiindings.

Under the subject of "Water Rights," we have contended that the City and its inhabitants are the owners of the water that has been diverted from the streams and applied to a beneficial use by the City

and its inhabitants. These water rights, leaving out the water rights which were purchased by the complainant Company and its predecessors, amount to approximately $2,000,000.00, and this item should be deducted from the total allowance of the Master's report.

The Master added to his estimate of the real value of the plant $800,000.00 for "Going Concern," notwithstanding the fact that it is apparent from the testimony of the witnesses that their estimates were based on the plant as a going concern. In fact, it was admitted by some of complainant's experts that were it not a going concern it would not be worth to exceed $5,000,000 or $6,000,000. It is apparent that in this case nothing should be allowed for the item of "Going Concern." It is questionable if it should ever be allowed for rate making purposes, but under the circumstances of this case where the Company exercises a monopoly, where they are dealing with a prime necessity, and where no expense can be anticipated for building up the trade, "Going Concern" should certainly be disallowed. And especially is this true where, as here, the company has no franchise.

The question of "Overhead Charges and Interest During Construction" is to be viewed in a somewhat different light from "Water Rights" and "Going Concern." There are cases in which overhead charges and interest during construction are proper items to be taken into consideration in arriving at the value of the plant, even for rate making purposes. These two items alone amount to $1,846,272.00, or 22.9 per cent of and added to the contract

price found by the Master for the structures. There is no attempt by the complainant Company to show any substantial basis for the allowance of either overhead charges or interest during construction. The evidence on these points is merely an academic discussion by the expert witnesses as to what should be allowed generally for such items. As said by Judge Evans in the case of *Louisville T. & T. Co. vs. Louisville*, 137 Fed. 637:

> "It does not follow that overhead charges as a separate item should be included as such. It seems to us that they are too intangible to be available for that purpose."

And now generally as to the question of the fair value of complainant's property. The evidence supporting this value is almost entirely expert testimony given by witnesses employed in the cause. There was a variation in the various estimates of the total value of the property of $4,000,000 or $5,000,000. As was said in the case of Knoxville vs. Water Company, *supra*:

> "We do not feel called upon to determine whether the demonstrated reduction of income to that point would or would not amount to confiscation. *Where the case rests as it does here, not upon observation of the actual operation under the ordinance, but upon speculations as to its effect based upon the operations of a prior fiscal year,* we will not guess whether the substantial return certain to be earned would lack

> something of the return which would save the effect of the ordinance from confiscation. It is enough that the whole case leaves us in grave doubt. The valuation of the property was an estimate and is greatly disputed." (Italics ours.)

So far as this particular question is concerned, there could not be two cases more nearly on all fours than the present case and the Knoxville case just referred to. The evidence in the present case is not of that character that courts demand when it is sought to set aside the act of a legislative body.

The Master allowed the sum of $140,000.00 annual depreciation to be deducted from the gross earnings of the company, and he calculated the sum of $1,320,970.00 as the depreciation of the plant since its commencement.

It is evident that under any system of determining depreciation when the reproduction theory is resorted to as a means of determining the value of the plant, the accrued depreciation deducted from the reproduction cost should be proportionate to the allowance for future annual depreciation. That is to say, if a certain allowance for depreciation has been made in the past in order to arrive at reproduction cost, the annual depreciation allowance should proportionately equal the depreciation of the past. But it appears from the report of the Master that he has allowed more than double for annual depreciation in the future than he has charged against the company for

depreciation in the past. Either the annual depreciation allowance is too large or the past depreciation allowance is too small. $70,000.00 or $75,000.00 should be deducted from the Master's estimate of annual depreciation or the depreciation to be allowed in the past should be doubled.

In determining what the rate of return is in any case, after finding the value of the property employed in the business and the gross income of the business, it is necessary to determine the operating expenses, and the company seeking the aid of the court when it claims its property has been confiscated, should freely and frankly show to the court what became of the gross returns it has received. In the present case the only evidence we have of what the operating expenses consisted of is the tabulation showing from 1895 to 1914 inclusive, the expenses of the company under a few general headings, without any explanation of these expenses, and under the rule laid down in the case of *Chicago etc. Ry. Co. vs. Wellman*, 143 U. S. 339, 345, it is incumbent upon the company seeking to set aside a rate that has been made, to show what it has done with the money it has received; the record discloses that the complainant has failed in this regard. It follows that the evidence was wholly insufficient to justify the Master in arriving at his findings or the court in making its decree.

Furthermore, it is seriously questioned that the rate of .0364 per cent, found by the Master, is confiscatory, even though the evidence had justified the Master in so determining the percentage. It may not

be as large a percentage of return as is desired, but there is a vast difference between a desired rate and a confiscatory rate.

This return is a substantial return, after taking care of all the operating expenses of the company, its taxes and a more than liberal allowance for depreciation, and upon a business where there is as little hazard or risk as in any business that can be imagined.

It is respectfully submitted, especially in view of the fact that the ordinance has not yet been tested and no opportunity afforded for such test, and that a previous unfavorable year was taken as a basis for estimating the earnings, that the language used in the Willcox case, 212 U. S. at p. 42, is peculiarly applicable and that this case is not one which justifies judicial interference.

In Smyth vs. Ames, 169 U. S. 466, this Court has mentioned certain matters which it says may be considered as guides in determining the value of a public utility's plant. In this list, reproduction cost is not even mentioned, and the Court, while it refers to original cost of construction, amount and market value of bonds and stocks, expenditures for improvements, probable earning capacity and operating expenses, as being things to be taken into consideration, adds:

> "We do not say that there may not be other matters to be regarded in estimating the value of the property. What the Com-

> pany is entitled to ask is a fair rate upon the value of that which it employs for the public convenience."

The Court thus recognizes that valuation of a public utility is not to be bound by hard and fast rules, but is to be governed by the circumstances of the particular case.

The reproduction cost theory seems to have gained ground in the last few years and has been applied to many cases, but the courts have never gone so far as to say that the reproduction cost is equivalent to the reasonable or fair value; it is merely a guide to judgment and not to be employed to the exclusion of all other methods, or where it leads to absurd results.

What is the reasonable value of the plant of the Water Company, taking all things into consideration? Let us concede, for purposes of argument, that its reproduction cost is $13,415,899.00. The City could produce a new plant, in all respects the same as the Water Company's plant, for that sum, plus the amount which has been allowed for depreciation to date. In other words, the value of the plant to the City is $13,415,899.00. What is its value to anybody else?

The witnesses produced by the Company have answered this question and have asserted that if the Company attempts to employ its works for any other purpose, the value will not even approach the reproduction cost, but will, as various witnesses have testified, be about $6,000,000.00 (Trans., p. 231).

This is not a junk value, but contemplates the use of all the Company's property for the next best purpose for which it might be employed, save that of furnishing Denver with water.

The fact that Denver is the only customer to which the Water Company can furnish water for domestic purposes should never be lost sight of. Denver is not bound to take water from the Water Company, but may at any time at its desire establish an independent plant of its own. In other words, the Water Company, from the day that the 1890 Ordinance expired in 1910, has been constantly subject to the danger of municipal competition, and to the danger of having to put its plant to its next most productive use. True it is that the City has not yet constructed a municipal plant and it may never do so, but the fact remains that from the day the franchise expired the danger that it might do so has been continually present.

Depreciation of the value of business and property on account of competition, or even the danger of competition, is a common incident of the business world from which none are exempt. Equally is it true that depreciation of property, other than physical depreciation, may result from a mere change in business conditions, or in the situation of the owners of such property. A man may build up a large and extensive business and construct a factory to manufacture some articles, protected by patent rights, for example. When his patent expires he may find his business depreciated in value and he may find his plant worth not even so much as it cost him or as it

would cost him to build it new, purely because he has lost what he previously had, to-wit, a monopoly in the production of the particualr article. Under these circumstances if he were to put his business and plant upon the market, he could not expect to get as much as he would have received while his patent was in force. Indeed, were the Water Company endeavoring to sell its plant to any person who should desire to step into its shoes and conduct its business in the City and County of Denver, it is highly improbable that the company could sell the plant to that person for its reproduction cost less physical depreciation, or anything near it.

So far as we are aware, municipal corporations are no more prohibited from driving "good bargains" or "hard bargains" than are individuals.

In the case of Denver vs. New York Trust Company, 229 U. S. 123, this court has said, referring to the plant of this very Water Company now being considered, at p. 141:

> "The next objection invokes the due-process-of-law clause of the 14th Amendment to the Constitution of the United States, and is, that the charter amendment subjects the water company to the alternative of accepting an inadequate price for its plant or of having its value ruinously impaired by the construction and operation of a municipal plant, and that this amounts to an unlawful deprivation of property. The objection is faulty in that it fails to recognize the real situation to which the charter

amendment applies. The Water Company, although the undoubted owner of the physical property constituting its plant, is without a franchise to maintain and operate it through the streets of the city, the prior franchise having expired; and the City not only is under no legal obligation to renew the franchise or to purchase the plant but is free to construct and operate a plant of its own. How, then, can it be said that the proposal, expressed in the amendment, to purchase the Company's plant at $7,000,000, and to devote $1,000,000 more to its betterment or else to construct a new one at a cost of $8,000,000 involves an unlawful deprivation of property or any right? See Madera Waterworks vs. Madera (228 U. S. 454); Detroit United R. Co. vs. Detroit (229 U. S. 39). Whether $7,000,000 is an adequate price for the Company's plant, and whether its value will be ruinously impaired by the the construction of a municipal plant, are beside the question. Being under no obligation to purchase, the City is free to name its own terms, and the Water Company is likewise free to accept or reject them. The latter is under no compulsion other than such as inheres in the nature of its property or arises from a proper regard for its own interests. That the City, mindful of its interests, offered $7,000,000 for the Water Company's plant, when it could have proceeded to the construction of a new plant of its

> own, without making any offer to the Company, affords no ground for complaint by the latter. Newburyport Water Co. vs. Newburyport (193 U. S. 561, 577).

The foregoing does not indicate that the right on the part of municipalities to bargain with a utility is cut off; indeed it is expressly asserted that such right exists. Let us, then, concede, for the purposes of this discussion, that the value of the plant is $13,415,899 for City purposes, and that the value of the plant for any other purpose is $6,000,000. Certainly any reasonable man who wanted to fix its "fair value" or "reasonable value" at the date of the passage of the ordinance would find it somewhere between these two figures weighing the probabilities of the plant continuing in the service of the City and the probabilities of its being devoted to its next most available use. Upon a valuation of $6,000,000 the rates under the ordinance would result in a return of over eight per cent. If the value was assumed to be half way between the two figures, that is, $9,700,000, the rate of return would be in excess of five per cent. In both cases we are assuming that the water rights actually belong to the Company, and are giving the Company credit for this item of property. If the water rights are not the property of the Company, the valuations would be to that extent lower and the rate of return substantially increased.

Is a rate on such basis fair to the Company? To answer this question we must ask another. Are public utilities to be by law exempted from the haz-

ards which inhere in every other business? Here is a corporation which was formed in 1894. It was formed for the purpose of absorbing a number of other corporations and such franchise rights as they possessed. Among these franchise rights (and there were several) was that granted by the 1890 ordinance. The franchise was in existence, its contents thoroughly known to the persons who incorporated the Water Company, and they, with full knowledge of all that it contained, adopted it. At the end of twenty years it expired, as it was bound to expire, and the Company was faced with the situation which now exists and which could throughout any of this period, or at any time during it, have been foreseen. It is unnecessary to enter into the reasons why Denver no longer desired to extend this franchise. It is enough that the fact is evidently so. Denver has not done any act or thing to impair the value of the Company's property, or to imperil the investment of its stockholders; it has simply taken advantage of a situation which was as inevitable as death; that is the depreciation in the value of the property which necessarily arose from the loss of the monopoly which the Company had theretofore enjoyed. Unquestionably it was the duty of the master to consider the circumstances of the Company at the time the 1914 ordinance was passed. But he seems to have entirely overlooked it.

If the master was to take, as he did in this case, the reproduction cost as his measure of value, he ought to have included in his estimate of accrued depreciation an additional amount over mere physical

depreciation, because of the Company's changed situation; for this changed situation has produced a depreciation in the value of the Company's property which is just as actual and just as real as the deterioration of the pipes which compose its distributing system. Had this been done the corporation would receive under the 1914 ordinance a very generous return; at least it would receive a very much higher return than it could receive if it should devote its plant to any other use.

The ordinance is not confiscatory. The judgment of the District Court should be reversed.

Respectfully submitted,

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OCTOBER TERM, 1917.

No. 294.

CITY AND COUNTY OF DENVER, ET AL.,
APPELLANTS,
vs.
THE DENVER UNION WATER COMPANY,
APPELLEE.

No. 295.

THE DENVER UNION WATER COMPANY,
APPELLANT,
vs.
CITY AND COUNTY OF DENVER, ET AL.,
APPELLEES.

APPEALS FROM THE DISTRICT COURT OF THE UNITED STATES FOR THE DISTRICT OF COLORADO.

BRIEF OF THE DENVER UNION WATER COMPANY.

GERALD HUGHES,
CLAYTON C. DORSEY,
Solicitors for The Denver Union Water Company.

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In the Supreme Court of the United States.

OCTOBER TERM, 1917.

No. 294.

CITY AND COUNTY OF DENVER, ET AL.,
APPELLANTS,
vs.
THE DENVER UNION WATER COMPANY,
APPELLEE.

No. 295.

THE DENVER UNION WATER COMPANY,
APPELLANT,
vs.
CITY AND COUNTY OF DENVER, ET AL.,
APPELLEES.

APPEALS FROM THE DISTRICT COURT OF THE UNITED STATES FOR THE DISTRICT OF COLORADO.

BRIEF OF THE DENVER UNION WATER COMPANY.

STATEMENT.

1. *What is Involved.*

Throughout this brief the appellants in No. 294 and the appellees in No. 295 will be referred to as the appellants, and The Denver Union Water Company,

appellee in No. 294 and appellant in No. 295, as the appellee.

The object of this suit was to have declared invalid and to enjoin the enforcement of an ordinance of the City and County of Denver, designated as Ordinance No. 26 of the series of 1914, which ordinance by its terms required the reduction of all of the rates then being charged by the Water Company by at least twenty per cent., and further required the Water Company to furnish to the municipality free of charge large quantities of water, and to comply with other restrictions, conditions and positive mandates, which were equally burdensome. The validity of the ordinance was attacked upon two distinct and wholly independent grounds. These were as follows:

First: That the ordinance was enacted by process of the initiative and passed by the City Council automatically, on the theory that having been petitioned for under the initiative provisions of the City Charter, the duty to pass it at once, without deliberation, delay or amendment, was mandatory, and that it was so passed without consideration of any fact relevant to and without determining the question of its reasonableness or propriety, without any investigation whatsoever, in utter disregard of facts known to the Council or easily ascertainable, which conclusively demonstrated its confiscatory character, and in reckless, wanton, complete and deliberate disregard of its ruinous effect upon appellee's business and property; that the real motive of the proponents of said ordinance, who petitioned therefor, was not in good faith to regulate the rates of the Water Company, but to force the Water Company to sell its property to the City at far less than its real value,

and that the City Council deeming itself powerless by reason of the initiative provisions of the charter to do otherwise, nevertheless enacted the measure; that under these circumstances, said ordinance and its enactment do not constitute legislative action at all, but merely an arbitrary exercise of power, which the courts will not countenance.

Second: That the rates and practices required and imposed by said ordinance were and are confiscatory, in that said ordinance rates were and are so low as not to permit a net earning equivalent to a reasonable return upon the fair value of the property devoted to the public use, and in that said ordinance required the furnishing of large quantities of water without any compensation therefor whatsoever, and in that the provisions and requirements of said ordinance were otherwise so unreasonable and burdensome as to render it invalid.

Primarily, therefore, this was and is a rate case. But there is something else now involved, and we deem it fair that the court should know what it is.

In the motion to advance heretofore filed, presented and granted herein, counsel said (p. 6): "This court, in passing upon the questions involved, will be asked to determine the value of appellee's property, or as to whether several of the items therein should be allowed, which determination will undoubtedly furnish a basis for further action on the part of the City and County of Denver in the acquisition of a municipal water plant." In the statement quoted above, counsel had reference to the following facts:

On February 21, 1916, in less than a month after the confirmation of the Master's report and the

entry of final decree in the court below, the City and County of Denver obtained from The Denver Union Water Company an option to purchase the property included in the Master's valuation at a price equivalent to the value found by the Master, adjusted to the date of payment by adding the cost of additions, extensions and betterments thereafter made, and deducting depreciation thereafter accrued, and further adjusted "by the addition or subtraction of such sums, items or elements of value as the United States Supreme Court (upon this appeal) may find or determine should be so added to or deducted from the foregoing valuation embraced in the Special Master's report," if it should so find or determine, with the proviso that the purchase price under said option should in no event exceed the valuation found by the Master, plus the actual cost of additions, extensions and betterments thereafter made, and minus the depreciation thereafter accrued as aforesaid. This option is still in force and requires the City immediately after this appeal has been disposed of to submit to the duly qualified electors the question of purchase thereunder.

At the City election held in May, 1917, the people of Denver, by an overwhelming majority, adopted a charter amendment, providing means whereby the question of issuing the requisite bonds to purchase the water plant under said option might be readily and promptly submitted to the taxpaying electors, and whereby the management of the plant, after purchase by the City, was provided for.

It therefore appears that, as matters now stand, this is not only a rate case, but also a purchase case. For more than twenty years the controversy over Denver's water plant has continuously raged. Its

harmful effect not only upon the Company, but also upon the community, cannot be exaggerated. It is hoped that as a result of the determination of this cause, and the exercise of the option mentioned above, this controversy may be definitely and finally settled. Certainly, that would be a consummation devoutly to be wished by all concerned.

2. *Historical Review.*

It is believed that a clear, connected and chronological statement of the facts involved, and of the events which led to the present litigation, will greatly aid in the solution of the questions here presented. The value of such a statement has been recently emphasized.

Rowland vs. Boyle, 244 U. S., 106, 109.

Appellants' brief is introduced by what is termed a "Statement of Case," and throughout the brief numerous other statements purporting to be statements of fact occur. Such statements are in many respects fallacious, quite unsupported by any evidence, and often in direct conflict with undisputed evidence and specific stipulations and admissions embraced in the record. This may be due to the fact that none of the counsel who represent appellants in this court had any connection with the case until after the Master's report had been made and filed. None of them participated at all in the taking of the testimony (which consumed many months), nor in the exhaustive arguments before the Master. With one exception, they did not enter the case until after it had reached this court. The record in this court is very large. The

record in the court below was many times greater. Familiarity therewith can be obtained only by the most laborious effort. Possibly the lack of this has caused the misstatements and omissions to which we refer; but, however this may be, they are manifestly misleading and extremely prejudicial. Some of them are corrected in the statement which follows; others will be noticed and corrected when we come to discuss the various topics to which they relate.

The statement which follows is to be read in connection with the historical matters set forth in Exhibit C at pages 3 to 10. It is intended to supplement those portions of Exhibit C.

In 1870 Denver's population was about 5,000. In that year the first water company (The Denver City Water Company) was incorporated, and it and its successors to 1894 are hereinafter referred to as the Denver Company (Exhibit C, p. 3; Exhibit ZZ, Record, p. 927). This company began to supply water in January, 1872, with a plant having a capacity of 2,500,000 gallons daily, and a distribution system about 4 miles in length (Exhibit C, pp. 4 and 8; Record, p. 166). From this time until 1889 the plant was gradually enlarged, but the supply was taken directly from the neighboring streams, and no provision was made for storage.

In 1889 Denver's population was about 96,000 (Exhibit C, p. 39). It was realized that for a population of this size, and that which might reasonably be anticipated in the near future, a water supply taken directly from the neighboring streams was wholly inadequate. The flow of the streams was variable and insufficient at best. The need of water was greatest at times when the streams were usually

lowest. It was manifest that great storage reservoirs must be provided at points distant from the City, where the waters flowing in the streams at times of flood might be impounded and conserved as a source of supply when the streams were low (Record, pp. 166, 167). At this point a disagreement developed among the stockholders of the Water Company. Local stockholders residing in Denver insisted on going to the mountains for water and providing the necessary storage reservoirs. Foreign stockholders refused to co-operate. The local stockholders sold out their interest in the Company and proceeded to establish a competing company for the purposes aforesaid. They organized The Citizens Water Company, which on November 22, 1889, received a franchise from the City (Exhibit A-2; Record, p. 931).

The Citizens Water Company began at once to procure a water supply, and to construct its plant. There followed a period of fierce competition between the Denver Company and the Citizens Company. Both actively engaged in construction work (Exhibit C, pp. 5 and 9). The Citizens Company developed sources of supply distant from Denver, and mostly in the mountains, acquiring the necessary water rights therefor, built long conduits to convey the water to Denver, commenced the construction of several large storage reservoirs, built mechanical filtration plants for the purification of the water, constructed a pressure reservoir within the City limits, and also much distribution system, which was constantly enlarged until 1894.

The Denver Company reconstructed and greatly enlarged its distribution system, constructed a large storage and pressure reservoir near the City, and

greatly enlarged and improved its pumping facilities and sources of supply.

The two companies were in active competition until 1894. A fierce rate war resulted, water finally being supplied by both companies to all consumers without charge (Record, pp. 167, 174). The usual result followed. The Denver Company, then owned by The American Water Works Company of New Jersey, went into the hands of a receiver in suits to foreclose outstanding mortgages (Exhibit C, p. 9). During this period of competition the Denver Company applied for a new franchise and contract, although that which it then possessed had not expired. On April 10, 1890, a new franchise was granted and contract entered into by Ordinance 44, series of 1890 (Exhibit A-3; Record, p. 941). The ordinance provided for certain flat rates set forth in Schedule A. It also provided (Section 5) that after five years from date of the ordinance the City might require the Company to fix schedule rates equivalent to the average rates of Chicago, St. Louis and Cincinnati, and (Sections 11 and 12) that at the expiration of twenty years from the date of the ordinance the City might purchase the plant or renew the contract for an additional term. Many years later the ordinance last mentioned was the basis of litigation, which afterwards came to this court.

City and County of Denver vs. New York Trust Company, 229 U. S., 123.

Notwithstanding the provisions of the ordinance of 1890, the rates thereby authorized were not, prior to 1894, collected. Owing to competitive conditions, as stated above, water was supplied free.

In 1894 Denver's population was about 116,000 (Exhibit C, p. 39).

On October 20, 1894, The Denver Union Water Company, appellee herein, was organized (Exhibit C, p. 3). The new company purchased all of the property owned by both of the old companies, constituting all of the property and property rights then used to supply Denver and its inhabitants with water. It paid therefor $7,000,000 of its first mortgage bonds out of a total authorized issue of $8,000,000, and all of its capital stock ($7,500,000) issued full paid and non-assessable (Record, pp. 116, 355). Thereupon the rates authorized by Ordinance 44 of 1890 were put in effect. Immediately, however, and in the year 1895, controversies with the City began, the City claiming the right to a rate reduction under the provision of Section 5, Ordinance No. 44, relating to the average of three cities. The Company offered the Leaflet Schedule as a compromise. All offers of compromise were rejected by the City (Record, pp. 174, 175, 178). Nevertheless, with the hope of avoiding a controversy, the Leaflet Schedule which provided for lower rates than Schedule A, was put in effect by the Company. Still the controversy continued and became violent. The Mayor advised the people not to pay the water rates, offered to furnish keys with which to turn on water, if turned off to enforce payment. The City enacted ordinances providing penalties against officers and employees of the Company, should they attempt to enforce collections under the Leaflet Schedule, and a great many arrests were made. At suit of trustee in Company's mortgage the United States Circuit Court, through Judge Thayer, enjoined the City and its officers from enforcing these ordi-

nances, or interfering with the collection of the rates, and this injunction was eventually made perpetual.

At about this time (1895) Clarence H. Venner (Record, p. 175) began suit against the Company attacking the foreclosure proceedings upon which the Company's title depended. These suits were in the Federal court and in the state courts of Colorado and New Jersey. They continued until 1910, when finally decided in Company's favor by the Supreme Court of the United States.

Meanwhile the controversy with the City continued, and in 1897 the City began suit against the Company (Record, p. 175), attacking price, pressure and purity of Company's supply, and reasonableness of Company's rules and regulations; price contention based on Section 5 of Ordinance 44. Trial of case in District Court consumed nine months; decided in Company's favor. The City appealed to Supreme Court, which, in 1907, likewise decided in Company's favor (41 Colo., 77).

In 1900 the City authorized and was about to issue $4,700,000 in bonds to build a competing water plant. Issuance of these bonds was enjoined by the Federal court at the suit of a taxpayer, and later the bonds were destroyed (Record, pp. 175, 178). In the same year (1900) the first Cheesman dam, then being constructed to form a large storage reservoir in the mountains, was washed out (Exhibit C, p. 9), and suits were brought by the Colorado & Southern Railroad and others claiming heavy damages (Record, p. 175).

On July 1, 1907, the suit begun by the City in 1897, involving price, pressure and purity, and also

the Company's rules and regulations, was decided in the Company's favor (41 Colo., 77).

On October 2, 1907, at the instance and request of the City, and in view of approaching expiration of twenty-year period, when, under Ordinance 44 of 1890, the City might elect to buy the plant or renew the franchise contract, Ordinance 163 of 1907 was enacted, and contract between the City and the Company made pursuant thereto, providing for valuation of plant by five disinterested appraisers, and determination by them of questions relating to rates (Record, p. 15, *et seq.*). During the same month the appraisers were appointed—Messrs. M. L. Holman of St. Louis and Frederick P. Stearns of Boston, by the City; Messrs. John R. Freeman of Providence and C. L. Harrison of New York, by the Company; and Mr. Allen Hazen of New York, by the four so selected. All were men of the highest ability and attainments, and completely disinterested (Record, pp. 195, 196, 210, 226).

On November 8, 1907, the appraisers began their investigations, which were most exhaustive and complete. These continued until March 20, 1909, when their report was filed; it is set forth in full in this record (Record, p. 27, *et seq.*). During this investigation repeated hearings were held; both City and Company were represented by eminent counsel; much testimony was taken, and enormous expense incurred both by the City and by the Company in preparation and presentation to the Board of all relevant matters. By the report of these appraisers jointly selected the value of the plant as of January 1, 1908, was found to be $14,400,000. On the question of rates as between (1) the Leaflet Schedule (the one now in force), (2)

Leaflet Schedule, less 10 per cent., and (3) Leaflet Schedule, less 20 per cent. (these being the sole questions submitted to the Board), the Leaflet Schedule was held the nearest approach to fair rates both to the Company and to consumers for the remaining franchise period; but the appraisers were unanimous in thinking that the Leaflet Schedule did not give as much return as the Company was entitled to (Record, p. 209). The appraisers were unable to agree upon fair rates for ensuing twenty-year period.

In 1910 Denver's population was 220,000 (Exhibit C, p. 39). Because of the expiration of the twenty-year period provided by Ordinance 44 of 1890, the Company in 1910 presented a new franchise contract for the ensuing twenty-year period. At the same time the opponents of the Company proposed by initiative petition an amendment to the Denver charter, designated as Section 264-A; said charter amendment has heretofore been considered by this court.

City and County of Denver vs. New York Trust Company, 229 U. S., 123.

Said Section 264-A created the Public Utilities Commission and named Armour C. Anderson, Edwin Van Cise and A. Lincoln Fellows the members thereof. It offered the Water Company, appellee herein, $7,000,000 in bonds of the City for the same property jointly appraised in the previous year at $14,400,000. It provided that unless said offer was accepted on or before July 1, 1910, the City should proceed at once to construct its own independent municipal plant for $8,000,000, and that an election to authorize the bonds for that purpose should be held on the first Tuesday in September following.

At an election held on May 17, 1910, the Company's proposed new franchise was defeated, and said charter amendment Section 264-A adopted. The offer of $7,000,000 made by said Section 264-A, being less than one-half of the appraised value, and $5,000,000 less than the Company's outstanding bonds (then $12,000,000, including South Platte bonds, infra, page 19, 20), not to mention its outstanding stock, was not accepted (Record, p. 319).

On August 20, 1910, the Public Utilities Commission appointed by said Section 264-A issued and promulgated for the information of voters a statement (Record, pp. 628, 629) setting forth among other things, that the Company's property just jointly appraised at $14,400,000 was worth, including going value, not more than $4,400,000, and certainly not more than $6,405,000, and in any event less than $7,000,000, and that a complete, new, independent plant could be built by the City for not to exceed $8,000,000. This statement, as Mr. Fellows admits, was issued without any real investigation of either question, and was grossly erroneous both as to the value of the existing plant and the cost of building a new one (Record, pp. 620, 621).

On September 6, 1910, the bond election contemplated by said Section 264-A of the charter was held, and the $8,000,000 in bonds provided for thereby was authorized for the purpose of building a competing plant. Thereupon, at the suit of the New York Trust Company, trustee in the Water Company's mortgage (the Water Company itself being cross-complainant), the United States District Court enjoined the City and the Public Utilities Commission from issuing bonds, constructing a new plant or in any wise inter-

fering with the Water Company in the enjoyment of its franchise rights. This injunction remained effective until the decision of this court, which was announced May 26, 1913. Notwithstanding the attitude and acts of the City, there was expended by the Company for additions, extensions and betterments between the date of the joint appraisal in 1908 and March 31, 1914, upwards of $2,000,000, almost all of which was invested subsequent to May 17, 1910. (Ex. Z, Rec., p. 926.)

On May 19, 1911, the New York Trust Company case was decided by the Circuit Court of Appeals, on appeal from the order of the District Court, allowing the temporary injunction. The Circuit Court of Appeals affirmed the order, holding that under the terms of Ordinance 44 of 1890 the City must elect either to buy the plant or to renew the contract, and that it had no other option.

City and County of Denver vs. New York Trust Company, 187 Fed., 890.

On May 26, 1913, the New York Trust Company case was decided by this court, to which it had come on *certiorari* directed to the Circuit Court of Appeals. This court reversed the decisions of the lower courts and held that the City was not obligated either to buy or to renew, but, at least so far as Ordinance 44, Series of 1890, was concerned, might construct its own independent plant.

City and County of Denver vs. New York Trust Company, 229 U. S., 123.

From July 1 to October 1, 1913, correspondence passed between the Water Company, appellee, and the

Public Utilities Commission, in which the Company repeatedly offered to sell its plant to the City at its present fair value, to be determined by court proceedings or by any fair method of appraisal; and in which it also offered the Commission full information relative to its property, both for rating and for purchase purposes. These offers were not availed of (Record, p. 319).

On August 6, 1913, the Public Utilities Commission appointed a committee of engineers, consisting of one of its own members, Mr. Fellows, and Messrs. Van Diest and Allen, to investigate and report upon the value of the Company's plant and the cost to the City of building a new plant (Record, pp. 70 to 75, 409). The investigation made by these engineers was the first and only investigation of either of these questions up to that time ever made by or on behalf of the City, except the joint appraisal of 1908 hereinabove mentioned (Record, pp. 621 *et seq.*).

In October, 1913, Leonard Metcalf, of Boston, and George G. Anderson, of Denver, were engaged by the Water Company to make a complete and independent inventory and valuation of its property (Record, pp. 258, 259).

In December, 1913, the Retail Association of the Denver Chamber of Commerce prepared and proposed a plan for the settlement of the water question (Record, p. 32; Exhibit A-48). The proposal was that the City agree to buy and the Company to sell its plant to the City at a price to be fixed by arbitration, which price could be paid at once or payment deferred, as the City might elect; price to be paid and the plant taken over at any time at City's option, but in any event at expiration of 20 years. Upon initia-

tive petition this plan was submitted to vote at an election held February 17, 1914.

On January 16, 1914, the report of the Public Utilities' engineers—Fellows, Van Diest and Allen—was filed and made public. By this report the valuation placed on the Company's lands and structures only (as of November 1, 1913) was $10,183,518.09, or, after certain deductions of property not deemed essential, $10,044,778.31. In this figure nothing was included either for water rights or going value (Record, p. 72). In their report said engineers also gave an estimate of the cost of a new system, which, however, they stated was a mere approximation, because "necessary information, such as surveys and detailed plans would develop, is wanting in every essential element" (Record, p. 74). According to this estimate, the cost to the City to build a new plant would be not less than $12,750,000, if diversion made on the Eastern Slope of the Continental Divide, and not less than $16,250,000, if diversion made from the Western Slope (the latter being recommended), to which cost in either event must, according to their statement, be added loss of operating profit that would have accrued to the City during the five years' construction period had it purchased the existing plant instead of building a new plant; said engineers strongly recommended purchase of the existing plant (Record, pp. 71 to 74).

Moreover, these engineers in the course of the investigation which culminated in their report, had free access to the Company's records and from them determined the gross earnings, operating expenses and net earnings for each year of the Company's life (1895 to 1913, inclusive), and set forth these facts in

detail in the written report which they filed (Exhibits A-64 and A-106, neither of which is produced here). They likewise testified concerning them when called as witnesses in this case (Record, pp. 427, 428, 429, 902). Upon the facts so ascertained these engineers found, and stated in their written report, that the net return to the Company, even under the going rates and upon assumptions as to value and other basic facts which plainly did the Company injustice, had throughout its history been grossly inadequate, and in said report they strongly recommended against any present attempt to reduce rates, even though the City should, as they also strongly recommended, purchase the plant.

Almost immediately upon the filing of the report of the Public Utilities' engineers referred to above a petition was circulated for the initiation of the rate-reducing ordinance involved in this suit (Record, p. 320).

On February 9, 1914, this petition, with 5,593 signatures attached, was filed with the City Clerk (Record, p. 320).

On February 17, 1914, the special election occurred, at which the proposal of the Retail Association of the Denver Chamber of Commerce for settlement of the water question was voted upon and defeated (Record, p. 320).

On February 24, 1914, the rate-reducing ordinance, with accompanying petition, was presented to the Council; on March 2nd it was published once, and on March 3rd it was passed by the Council without investigation, consideration or discussion, without notice to the Water Company, and upon the theory that being an initiated measure, the Council was ob-

ligated automatically to pass the same as presented without deliberation or amendment (Record, p. 320). Appellants herein, through the City Attorney, expressly admitted and stipulated before the Master that such was the view of the Council and the provisions of the City charter; that being an initiated measure, the Council had only one duty to perform, namely, to pass it without any question of any kind or character, and that the Council did pass it without any investigation or determination as to whether it was reasonable or not; that such was the view the Council took of its duty, and such was the foundation and reason for its action (Record, p. 360).

During February, 1914, Messrs. Metcalf and Anderson completed their inventory, investigation and valuation of the Company's property, and found its value as of October 31, 1913, to be $16,038,379 (Exhibit C, p. 64; Record, p. 259).

On April 29, 1914, the City being about to apply the provisions of the new rate ordinance to the water rates payable on May 1, this suit was begun.

3. *Financial History of Company.*

As appears from the foregoing statement, The Denver Union Water Company, appellee here, was organized in October, 1894, and purchased all of the property and property rights of every description then used in supplying the City and its inhabitants with water, paying therefor $7,000,000 of its first mortgage bonds out of a total authorized issue of $8,000,000, and all of its capital stock ($7,500,000) issued full paid and non-assessable. The property thus acquired was very ex-

tensive; it consisted of the various supplies and sources of supply, including water rights, infiltration galleries, mechanical filtration plants, reservoirs, pumping stations, conduits and distribution pipe systems, then constituting the plant. The total mileage of distribution mains was 373.732 miles, of conduits 55.295 miles, or a grand total of pipe mileage of 429.027 miles (Record, p. 149).

Generally speaking, in addition to the distribution system, the property then acquired consisted of the Cherry creek, Mississippi street, and Platte canon infiltration galleries and conduits leading therefrom to the City (those from Platte canon being more than 20 miles in length), the conduit from Platte canon through the Willard filters to the City, the Willard mechanical filters, the Strong or mountain reservoir, partly constructed, Marston lake, partly constructed and in operation, the Marston lake mechanical filters, the conduit from Marston lake to Wynetka, the Sullivan reservoir, Archer lake and canal, West Denver pumping plant, Ashland avenue reservoir, Capitol Hill reservoir (1st unit) and pumping plant, and all the appurtenant property, with the necessary water rights, including the Platte canon, Bear creek, Marston lake, Mississippi street, 15th street and Cherry creek rights, being practically all of the water rights now owned, except the Lake Cheesman rights.

After the purchase of the property, in order to complete the construction then under way, and for other necessary additions and betterments, the Water Company issued and sold the remaining $1,000,000 of its authorized bond issue, devoting the proceeds thereof to the work mentioned (Record, p. 166).

In 1899 the Water Company purchased and has since owned all of the capital stock of its subsidiary, The South Platte Canal & Reservoir Company (Record, p. 162).

In July, 1903, it caused its subsidiary to issue bonds to the amount of $4,000,000 secured by a mortgage upon the property standing in its name, and all of the proceeds of these bonds were likewise devoted to additions, extensions and betterments. The bonds of the South Platte Company are guaranteed by The Denver Union Water Company (Exhibit C, pp. 7 and 8).

Since its organization in October, 1894, the Company has declared but three dividends of 5 per cent. each (Record, p. 354). The rates forced upon it and its predecessor in 1890 by conditions of fierce competition, and later by public compulsion, have yielded a revenue which, to say the least, has been very far from excessive or unreasonable. Even the Public Utilities' engineers admit, report and testify that these rates have afforded less than a reasonable return throughout the Company's history (Record, pp. 428, 429; Record, pp. 71, 72). Notwithstanding this, many millions of dollars otherwise available for dividends have, with the consent of the stockholders, been reinvested in the plant to make the necessary additions and extensions required by the rapid growth of the City (Exhibit Z; Record, p. 926; Exhibit A-55).

Since May 1, 1914, the date of the Master's valuation, the Company has expended for additions, extensions and betterments upwards of $900,000 (Record, p. 798).

All of the money invested in additions, betterments and extensions, except that realized from the

sale of the $1,000,000 of Water Company bonds and the $4,000,000 of South Platte bonds, has been furnished by the stockholders out of funds otherwise available for dividends. The $8,000,000 of Water Company bonds matured July 1, 1914. They have not as yet been renewed. The $4,000,000 of South Platte Company bonds will mature on July 1, 1923.

4. *Extent and Condition of Plant and Character of Service.*

In Denver, owing to its location, climate and surrounding conditions, a much larger investment is required to supply an adequate water plant than in eastern cities of like population. This is obvious and undisputed, and is explained by the witnesses in this case (Record, pp. 198, 208, 236). In this region water is a commodity which is scarce and costly, and water rights adequate and available for the supply of a city like Denver extremely valuable and expensive.

Owing to the variable character of the streamflows and their unreliability, vast storage reservoirs must be provided, located in the mountains and at great distances from the point of use. Conduits of unusual length must be constructed to convey the water from the point of diversion to the place of use. Denver's population (220,000 in 1910) is scattered over an area of 59 square miles. As a consequence the distribution system must be much more extensive than is usually necessary to serve a population of that size (Exhibit C, p. 11). Moreover, in Denver the water is furnished not only for domestic and manufacturing uses, but also for the irrigation of lawns, trees and gardens, which is extensively car-

ried on, and which in that climate is essential. As a consequence the works must be much larger than in eastern cities of corresponding size. The consumption of water in Denver is enormous, incomparably greater than in eastern cities of like size (Record, pp. 208, 236). The average daily consumption of water in Denver for the year is about 45,000,000 gallons, or approximately 200 gallons each day for each person within the City limits. The average daily consumption during the irrigation season exceeds 65,000,000 gallons (the highest prior to 1914 having been 72,300,000), although at certain hours of each day during the irrigation season it is necessary to furnish water at a rate greatly exceeding this (Record, pp. 794, 796; Exhibit C, p. 39). It is, of course, necessary to have a plant adequately equipped to meet the highest demand with a sufficient margin of safety. As a consequence all elements of the plant must be much larger and more expensive than would be necessary were the service rendered in a lesser quantity and at a uniform rate.

Such a plant has been supplied and is being maintained by The Denver Union Water Company and the necessary investment cost furnished.

The Master (Record, p. 139; finding 52) made an express finding as to the excellent condition of the Company's plant, and the thoroughly adequate service which it rendered. The effect of this finding is not only that the plant is in excellent condition, the quantity of water abundantly in excess of the needs of the community, the pressure under which it is furnished good, compari[illegible] very favorably with the records in the majority [illegible]ur American cities, and the service rendered in every way satisfactory, but

also that the waterworks plant in adequacy, reliability and efficiency is equaled by only one, and surpassed by none, out of forty of the larger waterworks plants in the country with which it was compared. All competent persons who have examined the property and considered the question have come to the same conclusion, and the fact is undisputed and indisputable.

The engineers of the Public Utilities Commission stated in their report (Record, p. 71):

> "We find the system to be generally in excellent working condition, well maintained and well managed, and adequate for supplying the City's present needs. * * * (Record, p. 73.) We cannot recommend the construction of a new system. * * * (Record, p. 74.) The economic waste involved in the destruction of the existing plant, which is in good operating condition, rendering adequate service, by the construction of a new municipal plant, is not to be contemplated except as a last resort, and until every reasonable method of securing the present plant for the City on an equitable basis has been exhausted. * * * It would be equally unjust to destroy at least the major portion of the value of the property which has been rendering satisfactory service, and can continue to render service to the public adequately and efficiently, by the construction of a competitive plant. To refuse a fair capital return to any public utility corporation is but to smother enterprise, limit development,

and prevent growth of the community and the welfare of its inhabitants."

The water furnished is remarkably pure, being obtained from distant sources of supply, which are carefully protected from pollution, and, in addition, subjected to processes of filtration and sterilization, which render it as pure as or purer than the water furnished in any other city in the country (Record, pp. 149, 150).

As to the condition and adequacy of the plant and the character of the service rendered, the witnesses in this case, both for appellee and appellants, bear similar testimony. By the expenditure of enormous sums, both for original cost and subsequent additions, the appellee Company's plant has kept pace with the growth of the City and been adequately maintained. All of this has been done in the face of bitter, repeated, continuous and unwarranted attacks.

5. *Former Valuations.*

The first of these is that made by the joint board of appraisers, who reported in March, 1909, valuing the property as of January 1, 1908, at $14,400,000. These appraisers were appointed and their valuation made pursuant to Ordinance 163, series of 1907, and the contract between the Company and the City made in conformity thereto (Record, pp. 15 *et seq.*). This was entered into at the instance and request of the City, so that an agreed valuation might be arrived at, to be used as a basis of purchase in the event that the City should elect to purchase the plant, or as a basis for rates in the event that the City should elect to renew the franchise and contract as

provided in Sections 11 and 12 of Ordinance 44 of the series of 1890, or should grant a new franchise. The appraisers were selected with the utmost care. Those selected by the appellee Water Company were John R. Freeman, of Providence, Rhode Island, and C. L. Harrison, of New York City. Those selected by the appellant City were Frederick P. Stearns, of Boston, Massachusetts, and M. L. Holman, of St. Louis, Missouri. The fifth appraiser selected by the other four was Allen Hazen, of New York City. These appraisers were disinterested men, of national eminence, and by experience, ability and training in the highest degree qualified to perform the duties assumed (Record, pp. 25, 26). Four of them (Messrs. Freeman, Stearns, Harrison and Hazen) were connected with the planning of the works of the Panama canal, under appointments by the President of the United States (Record, pp. 195, 226). Three of them (Messrs. Freeman, Holman and Hazen) testified as witnesses in this case (Record, pp. 195, 210, 226). Their investigation was impartial, fair and complete. Repeated hearings were had, at which both the City and the Company were represented by counsel. Voluminous evidence was offered by both parties and considered by the appraisers. The contentions of either side were presented in argument by eminent counsel, and the report of the appraisers and arbitrators was filed on March 20, 1909, the investigation and consideration of the matters submitted having consumed about 18 months. The report of the appraisers and arbitrators is set forth at length in this record (Record, p. 27). It is fully explained by the three members of the board who testified. The property was valued by these appraisers

as of January 1, 1908. Between that date and May 1, 1914 (the date to which the Master's valuation related) the Water Company made large additions, extensions and betterments to the plant. The actual cost of the labor and materials required therefor (not including any overhead) was $1,784,618.82 (Exhibit Z, following page 926 of record). Including the overhead costs actually incurred, the cost of these additions, betterments and extensions exceeded $2,000,000. Messrs. Freeman, Holman and Hazen brought their valuation of 1908 down to date by consideration of these additions, and deduction of depreciation since accrued. Mr. Freeman (Record, p. 199) found the present value to be $15,370,000, without consideration of the increase in value of the water rights, although he was of the opinion that such an increase had occurred. Mr. Holman (Record, p. 213) by the same process, but making due allowance for the increase in value of water rights, found the present value to be $16,259,078. And Mr. Hazen (Record, p. 230) by the same process, but, like Mr. Freeman, without giving consideration to the increase in value of water rights, which he had not investigated, found the present value to be $15,300,000.

The evidence shows without dispute (Record, pp. 213, 510) that the increase in value of water rights since 1908 has been not less than 25 per cent. Upon the basis of the value of the water rights found by the appraisers in 1908, this would bring the present value of the plant, as found by Messrs. Freeman and Hazen, to approximately $16,000,000.

Beginning in October, 1913, Leonard Metcalf, of Boston, and George G. Anderson, of Denver, engineers of the highest standing, and particularly well versed

in matters pertaining to water works and water rights, made a complete and independent inventory and valuation of the Company's property. They, with a large force of assistants, were engaged continuously upon this work until the middle of February, 1914. The result of their labors is set forth in detail in Exhibit C, their Inventory and Report which, in its original form, is before this Court. Both testified as witnesses in this case (Record, pp. 258 *et seq.*, 302 *et seq.*). It does not admit of doubt that the work of these able and experienced men was in the highest degree thorough, conscientious and impartial. They found the value of the plant as of October 31, 1913, to be $16,038,379 (Exhibit C, p. 64). Exhibit C, setting forth, as it does, in the utmost detail, every relevant item concerning the Company's property, is itself conclusive evidence of the thorough character of the work done.

On August 6, 1913, the Public Utilities Commission of Denver appointed a committee of engineers to investigate and report upon the value of the Company's plant. These engineers were Mr. A. L. Fellows, of Denver, himself a member of the Commission, and Messrs. Edmond C. Van Diest, of Colorado Springs, and Charles P. Allen, of Denver. All of them testified as witnesses for defendants (appellants) (Record, pp. 408, 565, 684), although, in the main, Mr. Van Diest was their spokesman. To say the least, they were not friendly to the Water Company. It may be fairly stated that they were adversary and representatives of an unfriendly interest. They were engaged upon their work until January 16, 1914, when their report was made. Extracts from their report are set forth in the bill of complaint (Record, pp. 71 to 75). This

report was in many respects incomplete, as they themselves admitted. It was principally incomplete because it entirely omitted any valuation of water rights, and any allowance for going value. Some of the items included were grossly undervalued. Nevertheless, the value found upon those items which were valued at all was, according to the revised report of the Public Utilities' engineers, $10,021,681 (Exhibit 54, sheet 6-A; Record, p. 1080, original page 1380). If to the result thus arrived at by the Public Utilities' engineers we add what they omitted, to-wit, going value, and the value of water rights, the figures are interesting. Using the values on these items included in the joint appraisal of 1908, we add for going value $1,100,000, and for water rights $2,845,925, making a total $13,967,606. Using the values upon the omitted items as found by Metcalf and Anderson, we add for going value $1,200,000, and for water rights $3,530,000, making the total $14,751,681. Using the value of the omitted items as found by the Master (Record, pp. 122, 123), we add for going value $800,000, and for water rights $2,947,617, bringing the valuation, based upon the estimate of the Public Utilities' engineers, to $13,769,298.

The total valuation found by the Master (Record, p. 123) was $13,415,899.

From the foregoing it appears that there is a close correspondence between the total valuations as found by the City and the Company jointly in the appraisal of 1908, as found by Metcalf and Anderson in their appraisal of 1913, and as found by the engineers of the Public Utilities Commission of the City, when their figures are corrected, as they must be, to include omitted items valued by the others.

And it also appears that the total valuation as found by the Master is considerably less than any of these previous valuations. This is largely accounted for by the fact that the Master excluded certain items of property and elements of value which the others had included. This we shall presently demonstrate.

The valuations hereinabove referred to are all that have ever been made of appellee's plant. Appellants, at page 84 of their brief, refer to the figures of the witnesses Gaffey and Bickel, who testified on their behalf in the court below. But these figures, as the record conclusively shows, and as we shall presently point out, covered only the reproduction cost of structures, and nothing else, and are therefore not comparable with valuations of the entire property. As to the items which they covered, they corresponded very closely with the figures of the board of appraisers and of Metcalf and Anderson.

6. *Rate Ordinance, Manner of Its Enactment, and What Led to It.*

The events which preceded the enactment of the rate ordinance are summarized in the foregoing "Historical Review." (*Supra*, pp. 5 to 18.) Without repeating what is there set forth, it is obvious that the motive of the proponents of the ordinance was not fair regulation of the Water Company's rates, but something ulterior. This ordinance was the culmination of years of strife, marked by constant and unwarranted attack upon the Water Company, and accompanied by the most extravagant and unfounded assertions concerning the low value of its property, and continuous and conscienceless efforts to obtain it for less than its worth. It followed on the heels of the

decision of this court in the New York Trust Company case (229 U. S., 123), and therefore marched hand in hand with the constant threat made by Section 264-A of the City charter of a municipal plant and expulsion of the Company, unless it sold for $7,000,000. The ordinance was initiated in the midst of the campaign which preceded the vote upon the proposal of the Retail Merchants Association for settlement of the water question and purchase of the Company's plant at an arbitrated figure. At the time of its enactment there was available to the City and the City Council the valuation jointly found by the appraisers in 1909. There was also available the result of the recent investigation made on behalf of the City by the engineers of the Public Utilities Commission, which result, when due consideration be given to omitted items, was substantially equivalent to the finding of the board of appraisers. Both of the foregoing findings, with all of the data which supported them, were in the possession of the City as part of its official records. There was also available the result of the investigation of Metcalf and Anderson, which had just been completed.

Shortly prior to the initiation and the adoption of the ordinance the Company had furnished to the City, at its request, a statement of the Company's gross earnings, operating expenses and fixed charges for the preceding three years. At the same time the Company had tendered to the City and its officials all data in its possession, and any information which the City might require relative to said matters. The data in the City's possession and available to it clearly demonstrated the confiscatory character of the proposed ordinance.

Moreover, the engineers appointed by the Public Utilities Commission (Fellows, Van Diest and Allen), in the course of the investigation which culminated in their report of January, 1914, which had just been filed, had free access to the Company's records and from them determined the gross earnings, operating expenses and net earnings for each year of the Company's life (1895 to 1913 inclusive), and set forth these facts in detail in the written report which they filed (Exhibits A-64 and A-106, neither of which is produced here). They likewise testified concerning them when called as witnesses in this case (Record, pages 427, 428, 429, 902). Upon the facts so ascertained these engineers found, and stated in their written report, that the net return to the Company, even under the going rates and upon assumptions as to value and other basic facts which plainly did the Company injustice, had throughout its history been grossly inadequate, and in said report they strongly recommended against any present attempt to reduce rates, even though the City should, as they also strongly recommended, purchase the plant.

The City Council ignored it all. The ordinance was proposed by a petition, bearing 5,593 signatures, pursuant to the provisions of the City Charter relating to the initiative. The City Council passed it without notice to the Water Company, without giving it an opportunity to be heard, without any consideration or determination of the question of its reasonableness or propriety, without deliberation, and solely because it deemed itself bound by the provisions of the Charter relating to initiated measures to pass it automatically, immediately and without consideration of any ques-

tion except whether the petition was sufficient in form and signed by the requisite number of petitioners.

These facts are alleged in the complaint (Record, p. 76, paragraph 16th), were the subject of express admission and stipulation before the Master (Record, p. 360), and are covered by a distinct and detailed finding of the Master (Record, p. 119, finding 7). This finding is not excepted to, and the facts are not open to question.

7. *Present Litigation.*

The complaint was filed on April 29, 1914, the issues were speedily made up, and on May 21, 1914, the cause was, by consent of all parties, referred to W. J. Chinn, a prominent and able lawyer of Colorado Springs, as Special Master, "for the purpose of taking all testimony in the suit and reporting to the court said testimony, his findings of fact, and such conclusions of law as he may deem essential to the proper advisement of the court" (Record, p. 112).

The proceedings before the Master commenced on June 3, 1914, and continued with only minor interruptions until March 13, 1915 (Record, p. 141). In addition to the city attorney and the attorney for the Public Utilities Commission (which employed separate counsel), the defendants (appellants here) were represented by the Honorable T. M. Patterson, who, by consent of all parties, appeared as counsel for the Water Consumers' League. Many witnesses were examined on behalf of both parties. The testimony, all taken in the presence of the Master, was extremely voluminous, that for the plaintiff covering

3,882 typewritten pages, and that for the defendants, 4,356 typewritten pages (Record, page 142). In addition, each party introduced numerous exhibits. On behalf of defendants (appellants here) there were 72 exhibits, and on behalf of the plaintiff (appellee here) 160. Many of these exhibits were very extensive, and one of them, Exhibit C, which in its original form is produced in this court, is a library in itself. The exhibit last mentioned is a detailed inventory of the Water Company's property and report upon its valuation, prepared by Metcalf and Anderson. In addition to this, the Special Master, by consent of the parties, personally inspected the entire water plant (Record, p. 141). After the conclusion of the testimony, oral arguments of counsel before the Special Master consumed ten days. In addition, counsel for both parties filed with the Special Master elaborate printed arguments.

From April 10 to July 1, 1915, the Master devoted his entire time to a study of the record and the briefs and arguments of counsel. Thereafter he prepared his report, which was dated October 5, 1915, filed October 6, 1915, and is set forth in this record beginning at page 117. An inspection thereof is convincing proof of the fair and conscientious manner in which the Special Master performed his duties. It does not admit of doubt that every contention made by either party was duly considered, carefully weighed and decisively disposed of. It is equally evident that from the standpoint of the defendants (appellants here) every conceivable issue and contention of fact and of law was before the Master and in the court below presented and ably argued. In

short, the investigation was comprehensive, complete and impartial, and the result undoubtedly just.

In due time the defendants (appellants here) filed exceptions to the Master's report (Record, p. 1131 *et seq.*).

Thereupon, in view of the filing of defendants' exceptions and to protect the rights of plaintiff (appellee here), if the court should deem the points raised by defendants' exceptions open for consideration, plaintiff also (appellee here) filed exceptions to the Master's report, preceded, however, by this express reservation (Record, p. 1121):

> "In so far as under the order of reference in this case the report of the Special Master is in law conclusive as to any matters therein contained, the plaintiff does not consent to the review of such matters by the court, but files these exceptions, subject to such rulings as the court may make as to its right and duty to review such matters, to be urged, with respect only to such findings and conclusions as the court may find are so subject to review, and without waiver or prejudice of any and all of plaintiff's rights in the premises."

On January 28, 1916 (Record, pp. 1137, 1138), the exceptions of both parties to the report of the Special Master were overruled, said report was in all things confirmed, and it was ordered that "the cause pass to final decree for complainant, in accordance with the findings and recommendations of said Special Master."

On February 1, 1916 (Record, pp. 1140, 1141), final decree in favor of plaintiff was duly entered, whereby the report of the Special Master was again in all particulars approved and confirmed, and plaintiff (appellee here) granted the relief prayed in its complaint.

On July 29, 1916, defendants (appellants here) filed in the court below their assignment of errors (Record, p. 1147) and petition for appeal (Record, p. 1158), which appeal was granted and duly perfected.

Thereafter, in view of the appeal taken by defendants (appellants here), the plaintiff (appellee here), out of an abundance of caution, and so that it might not be precluded from presenting in this court certain contentions in opposition to those which the defendants sought to present, filed its assignment of errors on cross-appeal (Record, p. 1168), and its petition for cross-appeal (Record, p. 1176), which cross-appeal was likewise granted and duly perfected. Appellee's said assignment of errors on cross-appeal incorporated (Record, p. 1168) a reservation similar to that contained in plaintiff's (appellee's) exceptions to the Master's report, and expressly stated (Record, p. 1169) that the errors assigned would be prejudicial, and were to be considered "in the event, and only in the event, that the Supreme Court should upon the appeal taken herein by the defendants sustain the assignments of error, or some of them, filed herein by said defendants, as the basis of their said appeal." And in the petition for cross-appeal (Record, p. 1176) it was specifically stated that in praying said appeal, and in prosecuting the same, the appellee and cross-appellant was "in no wise complaining of the final decree in this cause, which was

in its favor." And it was further stated that said cross-appeal was to be considered by this court "only in the event that the Supreme Court of the United States should upon the appeal taken herein by the defendants sustain the assignments of error made by said defendants, or some of them." And it was further stated that said cross-appeal was taken, to the end that certain rulings of the Special Master and plaintiff's (appellee's) objections thereto might "be before the Supreme Court for its consideration and determination, in connection with said appeal heretofore taken by said defendants, and in opposition to the reversal of the decree in favor of plaintiff (appellee) heretofore entered herein."

The appeal of the defendants below is No. 294 in this court, and the cross-appeal of the plaintiff below (appellee in the principal appeal) is No. 295.

The record before this court does not contain, nor purport to contain, all of the evidence presented to the Special Master. This record contains only an abstract of the oral testimony of witnesses, and relatively few of the many exhibits. Of course, it does not set forth the result of the Master's personal inspection of the property. It was prepared by appellants for the sole purpose of presenting certain limited questions of law, as is evident from the stipulation by which it is accompanied (Record, p. 1120).

In due course the record on appeal was filed in this court and printed. And thereafter motion to advance, concurred in by both parties, was filed and granted, and the case set for the first day of the October Term, 1917.

ARGUMENT.

In this argument we shall not pursue the order in which the points are presented in appellants' brief. We shall follow an arrangement which seems to us more logical, and will take up and answer the various contentions of appellants in connection with our discussion of the topics to which they relate.

I.

CONSIDERATIONS LIMITING THE SCOPE OF THIS REVIEW. QUESTIONS ATTEMPTED TO BE ARGUED NOT OPEN TO APPELLANTS.

Although the record is large, the questions, if any, open to review by this court are few in number and limited in scope. This appellants overlook, and attempt to argue many points concerning which they are upon this record certainly foreclosed.

1. *The Order of Reference to the Master Was by Consent. His Conclusions Are Not Open to Question.*

Beyond doubt, the order of reference to the Master was by consent of all parties. It expressly so states upon its face (Record, p. 112). It covered the entire case and required the Master not only to take the evidence, but also to report his findings of fact and conclusions of law thereon. As is well known, an order of this nature cannot be made except by consent of all parties. It was so construed by the Master, as is evident from the very complete report

which he made embracing his findings of fact and conclusions of law upon the entire case, and upon every issue involved (Record, p. 117 *et seq.*). It was so construed by the parties, as is evident from their submission to the Master, in the long hearing which ensued, of every issue in the case and their failure to except because he determined the entire controversy. It was so construed by the court below, as is evident from the action taken at the time of the confirmation of the report (Record, pp. 1137, 1138, 1139, 1140). Under such circumstances the effect of the Special Master's report is well settled.

In Kimberly vs. Arms, 129 U. S., 512, a similar situation was presented and fully considered and the question conclusively determined. Speaking through Mr. Justice Field, the court says (p. 524):

> "It is not within the general province of a master to pass upon all the issues in an equity case, nor is it competent for the court to leave the entire decision of a case to him without the consent of the parties. It cannot of its own motion, or upon the request of one party, abdicate its duty to determine by its own judgment the controversy presented and devolve that duty upon any of its officers. But when the parties consent to the reference of a case to a master or other officer to hear and decide all the issues therein, and report his findings both of fact and of law, and such reference is entered as a rule of the court, the master is clothed with very different powers from those which he exercises upon ordinary refer-

ences without such consent; and his determinations are not subject to be set aside and disregarded at the mere discretion of the court. A reference by consent of parties of an entire case, for the determination of all its issues, though not strictly a submission of the controversy to arbitration—a proceeding which is governed by special rules—is a submission of the controversy to a tribunal of the parties' own selection, to be governed in its conduct by the ordinary rules applicable to the administration of justice in tribunals established by law. Its findings, like those of an independent tribunal, are to be taken as presumptively correct, subject, indeed, to be reviewed under the reservation contained in the consent and order of the court when there has been manifest error in the consideration given to the evidence or in the application of the law, but not otherwise."

In Davis vs. Schwartz, 155 U. S., 631, it appeared (p. 633) that:

> "The case was referred by consent of parties to a master 'to hear said causes and report to this court his findings of facts and conclusions of law.'"

This court, speaking through Mr. Justice Brown, said (p. 636):

> "As the case was referred by the court to a master, to report not the evidence

> merely, but the facts of the case, and his conclusions of law thereon, we think that his finding, so far as it involves questions of fact, is attended by a presumption of correctness, similar to that in the case of a finding by a referee, the special verdict of a jury, the findings of a Circuit Court, in a case tried by the court under Revised Statutes, Section 649, or in an admiralty cause appealed to this court. In neither of these cases is the finding absolutely conclusive, as if there be no testimony tending to support it; *but so far as it depends upon conflicting testimony, or upon the credibility of witnesses, or so far as there is any testimony consistent with the finding, it must be treated as unassailable.*" (Italics ours.)

In Schwartz vs. Duss (C. C. A., 3rd Cir.), 103 Fed., 561, the Circuit Court of Appeals, speaking through his Honor Judge Gray, held, as stated in the syllabus:

> "Where a circuit court, with the consent and agreement of parties, appoints a master with authority to take testimony and find all issues of law and fact, findings of fact made by the master and confirmed by the court are conclusive on appeal *unless plain error is unmistakably shown;* and unless such plain error is found, the appellate court will not review questions of law *which could only arise on a state of facts different from that found.*" (Italics ours.)

In Schwartz vs. Duss, 187 U. S., 8, 27, this court affirmed the decision last mentioned.

In Adamson vs. Gillilland, 242 U. S., 350, decided within the present year, these rules have been reaffirmed, the court, speaking through Mr. Justice Holmes, saying (p. 353):

> "The case is pre-eminently one for the application of the practical rule that so far as the finding of the master or judge who saw the witnesses 'depends upon conflicting testimony, or upon the credibility of witnesses, *or so far as there is any testimony consistent with the findings*, it must be treated as unassailable.' Davis vs. Schwarts, 155 U. S. 631, 636." (Italics ours.)

These rules have been time and again applied in the lower federal courts, including the Circuit Court of Appeals for the Eighth Circuit.

> Spring Garden Insurance Co. vs. Amusement Synd. (C. C. A., 8th Circuit), 178 Fed., 519, 521, 531.
>
> Moline Plow Co. vs. Carson (C. C. A., 8th Cir.), 72 Fed., 387, 388.
>
> Paine vs. Standard Plunger Elevator Co. (C. C. A., 3rd Cir.), 203 Fed., 242, 246.
>
> Westall vs. Avery (C. C. A., 4th Cir.), 171 Fed., 626, 629, 630.
>
> Murphy vs. Southern Ry. Co. (C. C. A., 5th Cir.), 115 Fed., 257.

Hattiesburg Lumber Co. vs. Herrick (C. C. A., 5th Cir.), 212 Fed., 834, 836, 841 to 844.

Connor vs. U. S. (C. C. A., 9th Cir.), 214 Fed., 522, 525, 526, 527.

In re Senoia Duck Mills, 193 Fed., 711, 719.

The fact that appellee (plaintiff below), as well as appellants (defendants below), filed exceptions to the Special Master's report does not, in view of the express reservations and conditions (Record, p. 1121) under which said exceptions were filed, in any manner affect the rule.

Hattiesburg Lbr. Co. vs. Herrick (C. C. A., 5th Cir.), 212 Fed., 834, 844.

Upon the foregoing authorities we respectfully submit that at least upon questions of fact, or upon mixed questions of law and fact, the Master's conclusions are unassailable, unless it can be conclusively shown that there was no evidence whatever to support the Master's finding. This burden rests upon appellants. Every question which they seek here to present is either wholly or partially a question of fact, on which the Master's finding is against them. The reluctance of an appellate court to disturb a finding of fact made in a lower court is axiomatic. Even before the new equity rules, when, in the absence of a reference by consent, the facts were found by the chancellor upon consideration of written depositions, the rule was well settled that:

> **"Where a chancellor has considered conflicting evidence and made his finding and decree thereon, they must be deemed to be presumptively correct in an appellate court; and unless an obvious error has intervened in the application of the law, or some serious mistake has been made in the consideration of the evidence, they will not be disturbed."**
>
> Thallman vs. Thomas (C. C. A., 8th Cir.), 111 Fed., 277, 283, and cases there cited.

And even in the absence of an agreed reference, but where, as here, and as is now required in ordinary cases under the new equity rules, the original finding has been made upon the testimony of witnesses adduced in the presence of the trier of the fact, the rule is still stronger.

In Harper vs. Taylor (C. C. A., 8th Cir.), 193 Fed., 944, the Circuit Court of Appeals, after quoting what had been said in Thallman vs. Thomas, *supra*, said:

> "This is the settled doctrine of this court (citing cases), and this rule is especially applicable when the evidence was taken orally in the court, and the chancellor had an opportunity to see the witnesses, observe their demeanor while testifying, judge of their candor and intelligence, and thus was able to determine more accurately their credibility and the weight to be given their testimony than an appellate court, which

must determine the facts upon a printed record."

But when, as here, it appears not only that the evidence upon which the findings were based consisted of the testimony of witnesses who appeared before the Master, but also that the reference to the Master covered the entire case and was by consent, the rule limiting the power of the appellate court to re-examine questions of fact is the same as that which controls the appellate court in considering a fact found by the verdict of a jury or by the trial judge in a law case. Such findings cannot be reversed or disregarded unless the parties seeking such reversal can conclusively show that there was no evidence whatever to support them; and such showing cannot be made unless the record brought to the appellate court contains and is shown to contain all of the evidence considered by the original trier of the fact.

In the case at bar the record confessedly does not contain all of the evidence which was before the Master. There is no certificate to that effect, and none could truthfully be made. The abstract of the oral testimony, though lengthy, is relatively very brief when compared with the 8,238 typewritten pages of transcript covering the original testimony. Of the 232 exhibits filed with the Master only 52 are produced here. The Master saw the witnesses, heard them testify, and was therefore able to judge of their credibility and of the weight to be given their testimony. Moreover, as the Master and the parties construed the order of reference, it empowered the Master to personally inspect the property involved, and thus gain first-hand evidence upon the issues pre-

sented. This he did (Record, p. 141). Of course such evidence cannot be incorporated into a transcript. To sum up: The record before this court does not contain, nor purport to contain, all of the evidence upon all of the issues, nor all of the evidence upon any issue decided by the Special Master. Under such circumstances the court must assume that every finding of fact was supported by sufficient evidence, and is not at liberty to presume otherwise; and in considering the questions of law, if any, rightly presented upon this record, the court must assume the absolute correctness of every finding of fact upon which the Master's conclusions of law, in whole or in part, rest.

In Sheffield etc. Co. vs. Gordon, 151 U. S., 285, it was held, as stated in the syllabus:

> "In the absence of a certificate by a master that the entire evidence taken by him was sent up with his report, it is impossible to impeach his conclusions upon it."

And the court, speaking through Mr. Justice Brown, said (p. 293):

> "In the absence of any certificate that the entire evidence taken by the master was sent up with his report, it is impossible to impeach his conclusion in this particular. (Citing authorities.) There is no presumption that all the testimony was sent up."

See also:

> United States vs. Copper Queen Mining Co., 185 U. S., 495, 497.
>
> Hansen vs. Boyd, 161 U. S., 397, 403.

Nashua Savings Bank vs. Anglo-American Co., 189 U. S., 221, 231.

Collier vs. United States, 173 U. S., 79, 82.

Texas & Pacific Ry. Co. vs. Cox, 145 U. S., 593, 606.

In Wheeler vs. Abilene National Bank Bldg. Co. (C. C. A., 8th Cir.), 159 Fed., 391, 392, the Circuit Court of Appeals, speaking through his Honor Judge Sanborn, said:

> "A master's finding of facts upon evidence taken by him cannot be impeached, in the absence from the record of his certificate or other competent proof, either that the evidence presented is the entire evidence taken by him or that it contains all the evidence which was before him relative to the specific finding or findings challenged. (Citing many authorities.)"

The fact that the evidence in part consists of that gained by actual inspection is deemed conclusive against the right of review.

Rebillard vs. Minneapolis etc. Ry. Co. (C. C. A., 8th Cir.), 216 Fed., 503, 505.

Christy vs. Schwartzchild etc. Co. (C. C. A., 7th Cir.), 160 Fed., 657.

Goldsmith Silver Co. vs. Savage (C. C. A., 1st Cir.), 229 Fed., 623.

2. *No Exceptions to Master's Report Upon Which Contentions Now Made by Appellants Can Be Based.*

Equity Rule 66 provides, in part:

> "The parties shall have twenty days from the time of the filing of the (master's) report to file exceptions thereto, and if no exceptions are within that period filed by either party, the report *shall stand confirmed.*" (Italics ours.)

Clearly, the purport of this rule, as of that which preceded it, is that the master's report shall be in any event conclusive, except as to those points attacked by specific exceptions filed in apt time.

> 2 Street's Fed. Eq. Prac., Secs. 1476, 1485, 1486.

In Medsker vs. Bonebreak, 108 U. S., 66, at 72, the court said:

> "The findings of the master are *prima facie* correct. Only such matters of law and of fact as are brought before the court by exceptions are to be considered, and the burden of sustaining the exceptions is on the objecting party."

In Sheffield, etc., Ry. Co. vs. Gordon, 151 U. S., 285, 289, 290, it was held that a master's report could not be reviewed unless exceptions thereto had been filed; that the exceptions must be specific, and general exceptions would be disregarded, and that the

review would be confined to the precise points indicated by the specific exceptions.

To the same effect see:

Story vs. Livingston, 13 Pet., 359, 366.

Brockett vs. Brockett, 3 How., 690.

Burns vs. Rosenstein, 135 U. S., 449, 455.

Coghlan vs. South Carolina R. R. Co., 142 U. S., 101, 115.

In 2 Street's Fed. Equity Practice, Sec. 1486, the whole matter is thus summed up:

> "A general exception to the master's report will not be considered. The report is presumed to be correct, and the party who disputes that correctness must clearly and specifically designate the errors of which he complains. He should clearly indicate what the report ought to have been on the point to which the exception is directed. An exception is insufficient that merely expresses dissatisfaction with the report in the form of general objections to the conclusions of the master upon the evidence, or to the results arrived at by him, and that is in substance and effect nothing more than an appeal from the determination of the master to the court to revise and reverse his decision. 'Cases are referred to a master not on account of his presumed superior wisdom, but to economize the time and labor of the court; and as exceptions are usually filed to his report, if they are so general as to require a rehearing of the entire case, there is really nothing

> saved by a reference.' (Quoted from Sheffield vs. Gordon, 151 U. S. 285, 291.)"

Many, if not all, of the points attempted to be raised by appellants are not supported by the proper exceptions to the Master's report. We shall notice these in detail when the topics to which they relate are discussed.

3. *The Assignment of Errors Does Not Present Points Sought to Be Raised on This Appeal.*

Revised Statutes, Sections 997 and 1012 (U. S. Compiled Statutes, Secs. 1653 and 1673), make an assignment of errors essential to a review by this court, either of a judgment at law or a decree in equity.

Rule 21 of this court, subdivision 4, provides that:

> "When there is no assignment of errors, as required by Section 997 of the Revised Statutes, counsel will not be heard except at the request of the court; and errors not specified according to this rule will be disregarded; but the court, at its option, may notice a plain error not assigned or specified."

The case at bar is a direct appeal from the District Court to this court, under Section 238 of the Judicial Code. Rule 35 of this court, relating to such appeals, requires the appellant to "file with the clerk of the court below, with his petition for the writ of error or appeal, an assignment of errors,

which shall set out separately and particularly each error asserted and intended to be urged." (Here follow provisions as to the specific character of the assignment.) "Such assignment of errors shall form part of the transcript of the record and be printed with it. When this is not done counsel will not be heard except at the request of the court; and errors not assigned according to this rule will be disregarded; but the court, at its option, may notice a plain error not assigned."

The provisions of these statutes and rules have been rigidly enforced. The power which the rules purport to reserve to the court, i. e., at its option to notice a plain error not assigned, is rarely, if ever, exercised. Certainly, it has never been exercised under such circumstances as are presented by this record.

In Grand Trunk Ry. Co. vs. Ives, 144 U. S., 408, 414, 415, 416, the matter is fully discussed, and the necessity of a specific assignment of error, definitely and precisely presenting the exact point sought to be urged in this court, strongly emphasized. It is there held that only those questions distinctly raised by such an assignment can be examined here.

To the same effect see:

Wood vs. Wilbert, 226 U. S., 384, 386.

Southern Ry. Co. vs. Gadd, 233 U. S., 572, 580.

George vs. Wallace (C. C. A., 8th Cir.), 135 Fed., 286, 295.

Same case affirmed, 201 U. S., 230, 244, 245.

Paraiso vs. U. S., 207 U. S., 368, 372.

Ryan vs. Koch, 17 Wall., 19.
Stevenson vs. Barbour, 140 U. S., 48.

The reluctance of the court to exercise the power which its rules purport to reserve (to notice a plain error not assigned) is illustrated in a recent decision.

San Antonio etc. Ry Co. vs. Wagner, 241 U. S., 476, 480.

In the case at bar the assignment of errors follows verbatim the exceptions to the Master's report, and is subject to the same criticisms and objections (Record, pp. 1131, 1147).

4. *Appellants' Brief Contains No Specification of Errors, and so Fails to Comply with the Rule of This Court.*

Rule 21 of this court, relating to the brief of appellant, requires that it shall contain, among other things (subdivision 2, paragraph 2), "a specification of the errors relied upon, * * * in cases brought up by appeal the specification shall state as particularly as may be in what the decree is alleged to be erroneous. * * * When the error alleged is to a ruling upon the report of a master the specification shall state the exception to the report and the action of the court upon it. * * * (Subdivision 4.) Errors not specified according to this rule will be disregarded; but the court, at its option, may notice a plain error not assigned or specified."

We submit that upon this record there is no plain error which would justify the court in exerting its reserved power to notice such plain error, though not specified.

The foregoing rule has been rigidly enforced, and precludes the review which appellants seek.

Portland Co. vs. United States, 15 Wall., 1.
Treat vs. Jemison, 20 Wall., 652.
Benites vs. Hampton, 123 U. S., 519.
Rowe vs. Phelps, 152 U. S., 87.

In Camden vs. Stuart, 144 U. S., 104, 115, the court said:

> "A suggestion is made in the brief of Mr. Camden's counsel that the expert erred in charging certain items to the account of expenses; but in view of Rule 21 of this court, which requires that 'When the error alleged is to a ruling upon the report of a master the specification shall state the exception to the report and the action of the court upon it,' we do not feel called upon to examine into the minor details of this report. There is a presumption of its correctness, which overrides any effort that has been made to show an error in this particular."

5. *The Record Is Incomplete, and Was Not Prepared for the Purpose of Presenting Points Now Urged.*

A strict adherence to the foregoing rule is particularly important, in view of the change in the equity practice concerning records on appeal. As we have hereinbefore pointed out (*supra*, p. 44), this record is obviously and admittedly not complete.

Under Rule 8 of this court, and Equity Rules 75 and 76, the purpose is clear to limit the record on

appeal to those portions only of the record in the lower court essential to the presentation in the appellate court of the questions properly reserved in the court below. Thus Rule 8 of this court states that it is promulgated "for the purpose of reducing the size of transcripts of record in cases brought to this court by appeal or writ of error, by eliminating all papers not necessary to the consideration of the questions to be reviewed." And Equity Rule 75, subdivision (b), requires that all parts of the evidence "not essential to the decision of the questions presented by the appeal" be omitted.

The rules referred to impose upon the appellants primarily the duty of preparing the record.

In the case at bar, in view of, and in attempted compliance with, these rules, appellants prepared the record now before this court, and appellee refrained from objecting thereto. The appellants had filed in the court below certain exceptions to the Master's report, and a certain assignment of errors repeating those exceptions. Thereby the points which might be presented upon this appeal were limited and specified. It is, to say the least, doubtful whether there are any questions open for consideration upon this appeal. If there be any, they are, at most, confined by the exceptions and the assignment of errors to a few naked questions of law. Obviously, the appellants prepared the record with this in view, and included only those parts of the evidence deemed by them "essential to the decision of the questions presented by the appeal." It is equally obvious that for the reason aforesaid appellee refrained from objecting to the record thus prepared. Notwithstanding this, appellants attempt to present and undertake to argue

in their brief numerous questions not raised at all by any exception to the Master's report or by any assignment of error, and refer to this incomplete record in support of their contentions. Clearly, such a course, if permitted, would result in manifest injustice. It is prohibited by the rules of this court and by well-settled principles of law.

In Grand Trunk Ry. Co. vs. Ives, 144 U. S., 408, 414, the court said:

> "We should bear in mind, however, that it is not for this court to say that the entire evidence in the case is set forth in the bill of exceptions, for that would be to presume a direct violation of a settled rule of practice as regards bills of exceptions, viz.: that a bill of exceptions should contain only so much of the evidence as may be necessary to explain the bearing of the rulings of the court upon matters of law in reference to the questions in dispute between the parties to the case, and which may relate to exceptions noted at the trial. A bill of exceptions should not include, nor, as a rule, does it include, all the evidence given on the trial upon questions about which there is no controversy, but which it is necessary to introduce as proof of the plaintiff's right to bring the action, or of other matters of like nature. If such evidence be admitted without objection, and no point be made at the trial with respect to the matter it was intended to prove, we know of no rule of law which would require that even the substance of it should

> be embodied in a bill of exceptions subsequently taken. On the contrary, to encumber the record with matter not material to any issue involved has been repeatedly condemned by this court as useless and improper."

By express rules the principles above stated are now applicable to the record on an appeal in an equity case.

In this state of the record the court must conclusively presume that every finding and determination of the Master and of the court below was based upon and supported by sufficient competent evidence, although that evidence be not included in the record brought to this court. (See cases cited *supra*, p. 45, 46.)

We do not at this time attempt to specify the particular contentions of appellants, which are foreclosed by the incompleteness of the record and by the lack of proper exceptions to the Master's report and a proper assignment of errors. This we shall do in discussing the topics to which they relate. Of course, the total lack of any specification of errors in appellants' brief will, if the rule be enforced, preclude consideration of any of appellants' contentions.

II.

METHOD, MANNER AND MOTIVE OF PASSAGE OF RATE ORDINANCE RENDER IT WHOLLY INVALID. RATES CANNOT BE REGULATED BY INITIATIVE PETITION. THE ACT OF THE CITY COUNCIL WAS NOT LEGISLATIVE, BUT AUTOMATIC. THE ORDINANCE IS AIDED BY NO PRESUMPTION OF VALIDITY.

The manner of the enactment of the rate ordinance, and the events which preceded and led to it, have been hereinbefore narrated, with appropriate references to the record (*supra*, pp. 5 *et seq.*, and 29 *et seq.*). The facts are undisputed and indisputable. The ordinance was initiated in the midst of the bitter campaign which preceded the vote upon the proposal of the Retail Association of the Denver Chamber of Commerce for a settlement of the water question, doubtless as a campaign measure by those opposed to the Retail Association plan. It was the culmination of a controversy which had continued unceasingly for many years. The obvious purpose of its proponents was not fair regulation of rates, but arbitrary reduction of earnings and consequent destruction of values. The act was in line with and part of a consistent plan to acquire the Water Company's property at much less than its real value, and to make the situation so intolerable that the Company would be forced to sell.

Pursuant to provisions of the Denver charter, an ordinance was initiated by a pefition privately circulated, to which, when it was filed, 5,593 signatures were attached.

Pursuant to this petition, and in compliance with the letter of the Denver charter, the City Council passed the ordinance. In so doing the members of the Council confessedly acted not in their legislative capacity, but automatically, as part of the machinery of the initiative process, set in motion by the petition, and merely as the register of the will of the 5,593 persons who signed said petition. The City Council did not give to the Water Company any notice of its proposed action, nor afford it any opportunity to be heard. The City Council did not make, nor attempt to make, any determination as to the reasonableness or propriety of the ordinance, or of any of its terms, nor did it at all investigate that question. The City Council utterly ignored facts in its possession, which were city records, and other information easily available, from which it conclusively appeared that the ordinance was confiscatory. The engineers of the Public Utilities Commission had just filed their report in which they set forth in detail the result of their investigations as to the Company's revenue and net earnings with the data upon which their conclusions were based, and in which they found and reported that the net return to the Company, even upon the going rates had, throughout the Company's history, been grossly inadequate, and in which they strongly recommended against any present attempt to reduce rates, even though the City should, as they also strongly recommended, purchase the plant. Even if the City Council had investigated these facts and had determined that the ordinance was confiscatory, it is clear that it would nevertheless have passed the same without amendment and in the exact form proposed by the petition, because the members of the City Council re-

garded themselves as bound to do so by the letter of the charter provisions relating to initiated measures.

A short time before, the Supreme Court of Colorado, in a case arising under the Denver charter had, by a divided court, held that where a measure had been initiated by petition, the duty of the City Council in respect thereto was merely ministerial and not legislative, and that even though the proposed measure was plainly unconstitutional, it was nevertheless the absolute duty of the City Council to at once pass it without amendment, or to promptly submit it to vote of the people.

Speer vs. People, 52 Colo., 325, 343 to 348.

These matters are the subject of an express finding by the Master. This finding is as follows (Record, p. 119):

> "7. Ordinance No. 26, series of 1914, was enacted by the City Council, as alleged in paragraph sixteenth (16th) of the bill (this record, page 76). The following additional facts concerning the enactment of this ordinance are established by uncontradicted evidence:
>
> On July 26th, 1913, the Public Utilities Commission, by letter (Exhibit A-46), asked the Water Company on what basis the going (leaflet) schedule of rates had been fixed, and requested a statement of its gross earnings, operating expenses and fixed charges for the preceding three years. The Water Company, by letter dated August 16th, 1913 (Exhibit A-47) gave the information requested. This letter also explained the basis of the Leaflet

Schedule of rates, and concluded as follows: 'We will be pleased to aid you in investigating these matters, and therefore desire to tender to your Commission and to the City Attorney all data in our possession, and any information which you may require.'

The Public Utilities Commission did not seek or obtain any additional information from the Water Company. The ordinance was drafted at the instance of the Public Utilities Commission, and then 'regularly initiated by the people under the terms of the charter' of the City. It was passed by the City Council and approved by the mayor March 3, 1914 (Volume 5-c, pp. 2311 to 2315; this record, p. 320). The Water Company had no notice from the defendants of the proposal to draft or enact the ordinance other than that given by its publication in a newspaper on March 2, 1914, although, as a matter of fact, it undoubtedly knew of the entire proceeding. When the ordinance came before the City Council for consideration the members of that body were of the opinion that it was their legal duty to pass it, without making any attempt to determine whether the rates prescribed by it were reasonable (Volume 6-c, p. 2822; this record, p. 360). The defendants, including the members of the City Council and of the Public Utilities Commission, state in paragraph thirteenth (13th) of the answer (this record, p. 101) that they have not 'sufficient knowledge or information upon which to base a belief' as to 'the gross

> earnings, operating expenses, taxes, net income,' etc., of the Water Company for any of its fiscal years from 1908 to 1913, inclusive, or as to 'the allowances made or should be made for depreciation, obsolescence or unusual contingencies.'"

The first paragraph of the foregoing finding adopts as the Master's finding and conclusively determines to be true the allegations of paragraph sixteenth of the bill. These, therefore, are to be deemed incorporated in the Master's finding, as a part thereof. The allegations relating to the passage of the ordinance are as follows (Record, p. 76):

> "Said ordinance No. 26 of the Series of 1914, was prepared and enacted without consultation or conference with complainant; without any notice to complainant or any opportunity afforded complainant to be heard in reference to the matters therein contained, and the effect thereof on the income and properties of the complainant. Neither the defendant, the city and county of Denver, or the Public Utilities Commission, or any member thereof, or the Council of the city and county of Denver, or any member thereof, attempted, prior to the enactment of said ordinance, to investigate the fairness or justness of the rates therein provided to be adopted by complainant, or the effect thereof on the income or properties of complainant. Said ordinance was conceived, prepared, drafted and enacted without reference to the fairness of the rates therein prescribed, or

> the effect on the properties and income of complainant, but for the purpose of crippling and hampering complainant in the operation of its water system and to depreciate the earning capacity and value of the properties and water system of complainant, in order to enable defendant, the city and county of Denver, and said Public Utilities Commission, to purchase and acquire the properties of complainant at less than fair actual present value, and less than the value heretofore fixed and determined through the joint appraisement of 1907 aforesaid, and the values ascertained by the engineers appointed by said Public Utilities Commission."

The foregoing finding was not excepted to, nor is it made the basis of any assignment of error. It is not open to question. True, the Master deemed it unnecessary to draw from the facts thus found the legal conclusion which inevitably followed, for, as stated in the paragraph of his report which immediately followed (Record, p. 120, paragraph 8), he was so clearly convinced that the ordinance rates were confiscatory that he refrained from declaring the ordinance invalid upon the other ground.

The attitude and action of the City Council was expressly conceded by the defendants (appellants) at the hearing before the Master, in the following words of the City Attorney (Record, p. 360):

> "'Another thing that must be borne in mind in this whole procedure is that it (the ordinance under attack) was not an ordinance passed by the City Council of the City

> and County of Denver. It was an ordinance initiated by the people of the City and County of Denver, and the Council had only one duty to perform under the charter, and that was to pass it without any question of any kind or character.' * * * Mr. Dorsey: 'Do you mean to say that the Council of the City and County of Denver passed this ordinance without any determination as to whether it was reasonable or not?' Mr. Stevens (City Attorney): 'Absolutely. They had no discretion in the matter. The charter says that when these measures come before the City Council, that within a certain time they shall submit them to the people; but this, as I understand it, was initiated and presented to the Council under the section which provides that when presented, with the signatures of a sufficient number of the citizens of Denver, it is mandatory upon the Council to pass it. In any event, that was the view that the Council took of its duties.'"

As to the finding of the Master (Record, p. 120) that "the ordinance was drafted at the instance of the Public Utilities Commission," it is sufficient to say that under Section 264-a of the Charter, from which alone that commission derives all its authority, the Commission is wholly without power to regulate the rates of any utilities except those which are owned and operated by the City.

Wheeler vs. City and County of Denver (C. C. A., 8th Cir.), 231 Fed., 8, 13, par. 3.

The City and County of Denver was created and is governed by Article XX of the Constitution of the State, which article was adopted in 1902 (see Colorado Session Laws 1901, pp. 97, *et seq.*; 1 Mills' Annotated Statutes (1912), p. c-269, *et seq.*). By Section 1 of said Article the City and County of Denver was created. By Sections 4 and 5 of said Article the people of said city and county were vested with exclusive power to make, alter, revise or amend their charter, or to adopt a new charter, and the machinery and method thereof was prescribed. By these sections it was provided that whenever any charter was adopted, or any amendment thereto made, certified copies thereof should be filed with the Secretary of State. And by Section 5 of said Article it was also provided that:

> "Each charter shall also provide * * * for the initiative by the qualified electors of such ordinances as they may by petition request."

It has been conclusively determined that the purpose of Article XX was to grant Home Rule to Denver, and its effect was to enlarge the powers of the municipality beyond those usually granted by the Legislature, and to confer not only the powers specially mentioned, but also to give to the people of Denver every power possessed by the Legislature in respect to the making of a charter for Denver.

> City of Denver vs. Hallet, 34 Colo., 393, 398.

It has also been determined that the Charter convention of the City and County of Denver, assembled

pursuant to Article XX to make a charter for the City, had all the powers with reference to the making of such charter which had been possessed by the State Legislature prior to the adoption of said Article XX.

People vs. Lindsley, 37 Colo., 476, 480.

Pursuant to said Article XX, and by the method there prescribed, the people of Denver adopted their own charter, which became effective March 29, 1904. Section 268 thereof (Section 270 of the revision of 1914) provided:

> "All power to regulate the charges for service by public utility corporations is hereby reserved to the people, to be exercised by them in the manner herein provided for initiating an ordinance."

Section 22 thereof, as amended May 17, 1910 (Sec. 265 of the revision of 1914), provided, in part:

> "Any proposed ordinance may be submitted to the Council by petition therefor of qualified electors equal in number to at least five per cent. of the last preceding vote for mayor, and such proposed ordinance shall be passed without alteration by the Council, and if vetoed by the mayor, shall be passed over his veto within thirty days after such petition is filed; or the Council shall refer such proposed ordinance to the qualified electors at the next municipal election held not less than sixty days after such petition is filed."

Certified copies of these charter provisions were duly filed with the Secretary of State, as required by Article XX of the Constitution.

By an amendment to the Constitution of the State, adopted at the general election in November, 1912, and now appearing as Section 6 of Article XX, it was provided:

> "All provisions of the charter of the City and County of Denver, * * * as heretofore certified to and filed with the Secretary of State, * * * are hereby ratified, affirmed and validated as of their date." (See 1 Mills' Ann. Stats. (1912), p. c-281-a; Colo. Sess. Laws, 1913, p. 671.)

By an amendment to the Denver Charter adopted February 14, 1913, and numbered Section 353-B (262-B of the revision of 1914), it was provided:

> "Whenever petitions under this charter are required to be based on the vote for mayor, the same shall be based on the vote of the commissioner who at the preceding general city and county election received the highest number of votes."

The foregoing constitutional and charter provisions were in effect at the time the ordinance here in question was initiated by petition and passed by the Council.

The provisions of the Denver Charter authorized by Article XX, and ratified by the constitutional amendment of 1912, clearly purport to confer upon the people of the city and county the power and right

to regulate by process of the initiative the charges for service made by public utility corporations. The method pursued in the present instance was in strict compliance with the letter of these provisions.

It is our earnest contention that so delicate and important a function as the regulation of rates for service cannot within constitutional limitations be delegated directly to the people, to be by them performed through process of the initiative.

In the case before us the Council did not, as it might have done, submit the ordinance to vote of the people at a general election. If it had done so the situation would be no better. But instead of doing so, the Council passed the ordinance because, and solely because, it was "submitted to the Council by petition therefor of qualified electors" in the requisite number, and because, and solely because, the Charter provided that an ordinance so submitted "shall be passed without alteration by the Council." Who the 5,593 signers of this petition were, nobody knows. They were not officers of the City, but irresponsible members of the general electorate. It does not even appear that they were taxpayers. Under the Charter it was unnecessary that they should be.

When we consider that the population of Denver is approximately 230,000, and the number of service connections to the Water Company's plant approximately 44,000, it certainly must be obvious that the mere fact that 5,593 unidentified and irresponsible persons saw fit to sign said petition ought not and cannot be permitted to operate as a regulation of the water rates, not only for the Water Company, but for all the other inhabitants of Denver.

The utter absurdity of the conclusion that 5,593 persons can, by signing their names to a petition, validly regulate rates for 230,000, is clearly evident when we consider that the power ostensibly reserved to the people by section 268 of the Charter is not merely to reduce rates, but to "regulate the charges." The power to regulate includes the power not only to lower but to raise. It follows that if the theory here acted upon by appellants be correct, any five thousand persons, by merely signing their names to a petition, can effectively *raise*, as well as effectively *lower*, the rates by twenty per cent. or any other amount which may please them and impose their will in that regard upon all the rest of the 230,000 consumers.

And when we further consider the circumstances under which, and the manner in which, this thing was done, and the fact that the ordinance rates effect a horizontal cut of more than twenty per cent. in the gross earnings, and of a much larger percentage in the net earnings of the Company, it seems to us clear beyond question that the act cannot stand.

In Home Telephone Co. vs. Los Angeles, 211 U. S., 265, this court, after remarking that the rates there in question had been fixed by the City Council, after due investigation, each member acting "under his personal responsibility as an officer," said (p. 280):

> "The charter of the City also contains a provision that upon petition of 15 per cent. of the voters of the City, any ordinance proposed must be submitted to the people and may be by them adopted. It is said, therefore, that the power of rate regulation

might be in this manner exercised directly by the electorate at large. It may well be doubted whether such a result was contemplated by the Legislature. There are certainly grave objections to the exercise of such a power, requiring a careful and minute investigation of facts and figures, by the general body of the people, however intelligent and right-minded. But the ordinance was not adopted in this manner in this case, and it will be time enough for the courts of the states and of the United States to consider, when that is done, whether the objections only go to the expediency of such a method of regulation, or reach deeper and affect its constitutionality."

The court is now confronted with such a case, and upon this record must decide whether the method of rate-regulation here followed can receive its sanction. True it is that since the decision in the Los Angeles case, *supra*, the court has refused to declare invalid the provisions of certain state constitutions relating to the initiative and referendum.

Pacific States Tel. & Tel. Co. vs. Oregon, 223 U. S., 118.

Kiernan vs. Portland, 223 U. S., 151.

Davis vs. Ohio, 241 U. S., 565.

But the attack there made was solely upon the ground that such provisions violated Section 4 of Article IV of the Constitution of the United States, in that they destroyed in the states in question a re-

publican form of government, and this court, in refusing to consider the contention, held that the question was not judicial, but solely legislative; that it rested exclusively with Congress to decide what government is the established one in a state, and whether or not it is republican in form, and that its decision is binding on every other department of the Government, and cannot be questioned by the judiciary.

The objection here raised, however, is altogether different from that considered in the foregoing cases. It is here asserted that the power to regulate rates has been exerted in an unconstitutional manner, and in such a way as to amount to a deprivation of property without due process of law, and a denial of the equal protection of the laws. The distinction is clearly pointed out in the first of the cases hereinabove cited, wherein the court, speaking through Mr. Chief Justice White, said (223 U. S., 150):

> "How better can the broad lines which distinguish these two subjects be pointed out than by considering the character of the defense in this very case? The defendant company does not contend here that it could not have been required to pay a license tax. It does not assert that it was denied an opportunity to be heard as to the amount for which it was taxed, or that there was anything inherent in the tax, or involved intrinsically in the law, which violated any of its constitutional rights. If such questions had been raised they would have been justiciable, and therefore would have required the calling into operation of judicial power. Instead,

> however, of doing any of these things, the attack on the statute here made is of a wholly different character. Its essentially political nature is at once made manifest by understanding that the assault which the contention here advanced makes it not on the tax as a tax, but on the state as a state. It is addressed to the framework and political character of the Government, by which the statute levying the tax was passed. It is the Government, the political entity, which (reducing the case to its essence) is called to the bar of this court, not for the purpose of testing judicially some exercise of power assailed, on the ground that its exertion has injuriously affected the rights of an individual because of repugnancy to some constitutional limitation, but to demand of the state that it establish its right to exist as a state, republican in form."

No court has yet held that the rates of a public utility can be regulated and reduced by process of the initiative, or by direct action of the people themselves, who are consumers of the product of the utility; and we respectfully submit that within constitutional limitations no court ever can so hold. Particularly has no court ever yet held that the rates of a public utility can be regulated and reduced or raised by the mere fiat of a petition, and by the simple act of a small fraction of its consumers in signing their names to such petition, and we respectfully submit that no court within the limitations of the Constitu-

tion, of reason or of sound common sense, ever can so hold.

The delicate nature of the function of rate-regulation, and the care with which it should be exercised, have been frequently recognized.

In Knoxville vs. Knoxville Water Co., 212 U. S., 1, 18, this court said:

> "It is a delicate and dangerous function, and ought to be exercised with a keen sense of justice on the part of the regulating body, met by a frank disclosure on the part of the company to be regulated. The courts ought not to bear the whole burden of saving property from confiscation, though they will not be found wanting where the proof is clear. The legislatures and subordinate bodies, to whom the legislative power has been delegated, ought to do their part. Our social system rests largely upon the sanctity of private property, and that state or community which seeks to invade it will soon discover error in the disaster which follows. The slight gain to the consumer, which he would obtain from a reduction in the rates charged by public-service corporations, is as nothing compared with his share in the ruin which would be brought about by denying private property its just reward, thus unsettling values and destroying confidence."

In Cleveland Gas Light & Coke Co. vs. City of Cleveland, 71 Fed., 610, Circuit Judge Jackson, delivering the opinion of the court, said (page 612):

> "It would be a fearful proposition—monstrously absurd and outrageous—if the Legislature were to undertake to confer upon a citizen of Cleveland the right to say at what price services should be rendered to him, or what he should pay for goods and articles furnished him. There is hardly any law in this land that would make the party being furnished the judge of the price that he should pay, or would say that his arbitrary decision should fix the rights of the parties."

In *ex parte* Farnsworth, 61 Tex. Cr., 342, 353; 135 S. W., 535 and 539, there was involved an ordinance regulating telephone rates, which had been adopted under the initiative and referendum provisions of the city charter. The ordinance was for this reason held to be entirely invalid. The case was twice considered. In the course of the first opinion the court says (135 S. W., 537):

> "To hold that a law could be suspended by the referendum, or enacted by the referendum, would or might easily result in the deprivation of our citizenship, of life, liberty or property without due process of law. The ordinance in question may be a fair illustration and verification of that statement. Such a proceeding would condemn without charges or specifications, without a hearing or the forms of a trial, in the absence of evidence, without a jury, and even without a court, to be exercised only by the secret in-

quisition of the ballot box. The referendum not only sets at defiance these constitutional guaranties, but it as well destroys the purpose and authority of the legislative department, or, on the other hand, may make that body omnipotent and superior to the constitution from which its authority is derived. It would reinvest the people with the functions of legislation conferred upon that department of government. It is also a direct attack upon the judicial system provided by the Constitution. The courts were ordained for the purpose of the trial of causes, awarding to the citizenship tribunals in which their matters may be tried and adjusted. Referendum refuses a hearing. It takes the place of the constituted judiciary, and tries the rights of property through the ballot-box. * * * The property of the citizen may be confiscated, and he made a bankrupt, without a hearing and without due process of law. * * * (p. 538). If what has been stated is correct, then the ordinance in question is void. It deprives those whom it affects of their constitutional rights and their rights as citizens to be heard when their property is sought to be taken or hampered, with such rates and charges as would prove destructive. Any law, state or municipal, which would undertake to deprive a man of his life, liberty or property without giving him a hearing, or in any manner affect his rights without a hearing, would necessarily be vicious

and unconstitutional. Ours is a country of law, and whenever a man is affected in his life, liberty or property, he has the right to resort to some legal tribunal where those matters can be honestly and fairly adjudicated."

In the second opinion the court said (135 S. W., 539):

"It is contended, in effect, that under the initiative and referendum provisions of the Charter of Dallas the voters, in the manner that it was done, had the right and power to enact the said ordinance, and that it is valid and binding, notwithstanding it was neither enacted by the Board of Commissioners, nor prior to its submission to the voters, the said board had provided rules and regulations for hearing said Telephone Company, and thereunder given it a fair hearing as to the provisions of said ordinance before it was enacted. We cannot sustain this contention. As is shown above, the said ordinance was passed by the voters and not by the Board of Commissioners, and that, too, without a hearing of any kind, under rules and regulations prescribed and adopted by the board. Therefore said ordinance is invalid and not effective in the City of Dallas."

In Southwestern Tel. & Tel. Co. vs. City of Dallas, 104 Tex., 114; 134 S. W., 321, 323, the court said:

"In the exercise of the power to regulate and fix rates, etc., there must be a body who

> can hear evidence and decide upon the reasonableness or unreasonableness of the rate or regulation, and if that cannot be done by the initiative—the popular vote—then the authority cannot be exercised in that manner. Can it be necessary to offer argument to show to any man that such hearing as the law provides could not be had in a campaign before the electorate of the city? It is too manifest for controversy."

And the court held a rate-regulating ordinance adopted by process of the initiative invalid for that reason.

In the case at bar, by the act here under consideration, the rates were actually regulated, and reduced by more than 20 per cent., through the naked fiat of 5,593 unknown individuals. They were self-chosen and represented no one but themselves. They constituted a very small fraction of the 230,000 consumers of water from appellee's plant. Doubtless, they themselves were users of the water and payers of the rates. They drafted the ordinance, and their act alone put it in effect. The letter of the Denver Charter seems to authorize such procedure. Whether it does or not, nevertheless, it was so regarded by the City Council, and the result is the same. We submit that such an ordinance cannot be upheld.

In Agua Pura Co. vs. Las Vegas, 10 N. M., 6; 60 Pac., 208, the court declared invalid an act giving the City Council power to fix water rates without investigation, holding that the power to regulate rates must either be exercised by the legislature itself di-

rectly, or if delegated to any subordinate authority, it must be under provisions which will insure its exercise in a reasonable manner, and with some provision by which the rights of parties to be affected may have the protection of judicial determination. In the course of the opinion it is said:

> "If the method of regulating rates by a commission, provided for in the Minnesota case (134 U. S., 418), is invalid because without due process of law, for how much stronger reason must an act be invalid which undertakes to delegate the legislative power, not to an impartial commission, but to one of the parties in interest? It is one of the oldest maxims of law that no one can be judge in his own case. Here not only is the city council the direct representative of the inhabitants of the community, the supplying of whom constitutes the greater part of the business of this and similar companies, but as to the supply of water for municipal purposes it is itself a consumer, and is the actual and direct party in interest, with which the Water Company is obliged to contract. To say that the party which is itself the purchaser should have the absolute power to fix the price at which the owner of a commodity shall sell it to him, would be to state a proposition that no member of the community would for a moment admit, if applied to his own business. It is not to be supposed, judging from the known rules of human conduct, that a

> regulation of price by the purchaser himself would be fair or reasonable."

A fortiori is this true where, as here, the delegation of unrestricted power is assumed to be to any 5,000 out of 230,000 consumers of the Company's product.

The necessity of fair investigation and deliberate legislative action in good faith has in rate cases been frequently emphasized, and in their absence rate-regulations held invalid.

> C. M. & St. P. Ry. Co. vs. Minnesota, 134 U. S., 418, 456.
>
> San Diego Land Co. vs. National City, 174 U. S., 739.
>
> Budd vs. New York, 143 U. S., 517, 546.
>
> Chesapeake & Potomac Tel. Co. vs. Manning, 186 U. S., 238, at 245.

In the foregoing cases the distinction between legislative action and that which is not legislative, and between the presumptions which attach in the former case, and are absent in the latter, are clearly pointed out.

In Missouri Pacific Ry. Co. vs. Nebraska, 217 U. S., 196, the court, in considering a statute which compelled carriers to put in spur switches, said (p. 207):

> "If the statute makes the mere demand (for spur switches) conclusive, it plainly cannot be upheld. If it requires a side-track only when the demand is reasonable,

> then the railroad ought at least to be allowed a hearing in advance, to decide whether the demand is within the act. Sometimes when summary action is necessary, the property owner's rights are preserved by leaving all questions open in a subsequent suit (citing cases). But in such cases the risk is thrown on the destroyer of property. In this case there is no emergency, yet, at the best, the owner of the property, if it has any remedy at all, acts at its risk, not merely of being compelled to pay both the expense of building and the costs of suit, but also of incurring a fine of at least $500 for its offense in awaiting the result of a hearing."

In the case at bar the mere demand of the signers of the petition for the passage of the ordinance in question, and the reduction of rates which it required, was deemed by the City Council conclusive under the terms of the Denver Charter, and was so acted upon. This ordinance, like the statute involved in the case last cited, provided heavy penalties for its violation (Record, p. 90, sec. 4).

In Oregon R. R. & N. Co. vs. Fairchild, 224 U. S., 510, the court, in construing a statute giving the railroad commission power to order the installation of switch tracks, said (p. 524):

> "It complains that the statute did not afford it the means of making a defense before the commission, and yet required it to attack the reasonableness of the order on such evidence as it might have been able to pro-

duce before the administrative body. If this were true, the defendant's position would be correct, for the hearing which must precede the taking of property is not a mere form. The carrier must have the right to secure and present evidence material to the issue under investigation. It must be given the opportunity, by proof and argument, to controvert the claim asserted against it, before a tribunal bound not only to listen, but to give legal effect to what has been established."

In *ex parte* Young, 209 U. S., 123, at 147, the court said:

> "If the law be such as to make the decision of the legislature, or of a commission, conclusive as to the sufficiency of the rates, this court has held such a law to be unconstitutional. Chicago, etc., Ry. Co. v. Minnesota, 134 U. S. 418."

And this statement was approved in Missouri Pacific Ry. Co. vs. Tucker, 230 U. S., 340.

But in the case at bar it was assumed by the City Council that the decision of 5,593 persons, out of 230,000 persons concerned, evidenced by their signatures to a petition, was "conclusive as to the sufficiency of the rates," and the ordinance was passed upon that assumption.

Even though the provisions of the Denver Charter had been other than they plainly were, and, properly construed, had not permitted the regulation of

rates in the manner here attempted, yet the City Council construed them otherwise, and so construing, acted confessedly in an arbitrary manner. That the proponents of the measure likewise acted arbitrarily and for an ulterior and sinister purpose, does not admit of doubt. The case is clearly ruled by many prior decisions of this court.

In Yick Wo vs. Hopkins, 118 U. S., 356, the ordinance in question was so framed as to leave room for the play of arbitrary action in its administration, and consequently was held invalid. In the course of the opinion the court says (p. 369):

> "When we consider the nature and the theory of our institutions of government, the principles upon which they are supposed to rest, and review the history of their development, we are constrained to conclude that they do not mean to leave room for the play and action of purely personal and arbitrary power. Sovereignty itself is, of course, not subject to law, for it is the author and source of law; but in our system, while sovereign powers are delegated to the agencies of government, sovereignty itself remains with the people, by whom and for whom all government exists and acts. And the law is the definition and limitation of power. It is, indeed, quite true, that there must always be lodged somewhere, and in some person or body, the authority of final decision; and in many cases of mere administration the responsibility is purely political, no appeal lying except to the ultimate tribunal of the

public judgment, exercised either in the pressure of opinion or by means of the suffrage. But the fundamental rights to life, liberty, and the pursuit of happiness, considered as individual possessions, are secured by those maxims of constitutional law which are the monuments showing the victorious progress of the race in securing to men the blessings of civilization under the reign of just and equal laws, so that, in the famous language of the Massachusetts Bill of Rights, the government of the commonwealth 'may be a government of laws and not of men.' For, the very idea that one man may be compelled to hold his life, or the means of living, or any material right essential to the enjoyment of life, at the mere will of another, seems to be intolerable in any country where freedom prevails, as being the essence of slavery itself.

* * * * * * * *

(P. 371): The same principle has been more freely extended to the quasi-legislative acts of inferior municipal bodies, in respect to which it is an ancient jurisdiction of judicial tribunals to pronounce upon the reasonableness and consequent validity of their by-laws. In respect to these, it was the doctrine, that every by-law must be reasonable, not inconsistent with the charter of the corporation, nor with any statute of Parliament, nor with the general principles of the common law of the land.

particularly those having relation to the liberty of the subject or the rights of private property. Dillon on Municipal Corporations, 3d ed., Sec. 319, and cases cited in notes. Accordingly, in the case of The State of Ohio ex rel. etc. v. Cincinnati Gas Light and Coke Company, 18 Ohio St. 262, 300, an ordinance of the city council purporting to fix the price to be charged for gas, under an authority of law giving discretionary power to do so, was held to be bad, if passed in bad faith, fixing an unreasonable price, for the fraudulent purpose of compelling the gas company to submit to an unfair appraisement of their works."

In Knoxville Water Co. vs. Knoxville, 189 U. S., 434, the court was considering a rate ordinance duly and properly enacted by the City Council. Nevertheless, in the course of the opinion it was said:

"It is argued here that the reduction of rates is not reasonable, and is or may be taking a first step towards a compulsory purchase of the Company's plant at an unfairly low price, by cutting down its value. We may assume, with the Supreme Court of Tennessee, that if rates were reduced unreasonably, a judicial remedy would be found. We may assume, further, that an attempt to affect the price of the Company's plant in that way, if the city should elect to purchase, would not be allowed to succeed."

In San Diego Land & Town Co. vs. Jasper, 189 U. S., 439, 443, the court said:

> "Of course, as we indicated the other day in Knoxville Water Co. vs. Knoxville, ante p. 434, if an attempt had been made to cut down values by the reduction of rates, the courts would know how to meet it."

In San Diego Water Co. vs. San Diego, 118 Cal., 556, the Supreme Court of California, referring to the section of the statute by which the legislative power to regulate rates had been delegated to the City Council, said (p. 566):

> "The meaning of the section is that the governing body of the municipality, upon a *fair investigation and with the exercise of judgment and discretion*, shall fix reasonable rates and allow just compensation. If they attempt to act *arbitrarily, without investigation or without the exercise of judgment and discretion*, or if they fix rates so palpably unreasonable and unjust as to amount to arbitrary action, they violate their duty and go beyond the powers conferred upon them." (Italics ours.)

In Dobbins vs. Los Angeles, 195 U. S., 223, the court had under consideration an ordinance duly enacted by the City Council and fair on its face. It was nevertheless found to be arbitrary, because passed without due consideration, or sufficient reason, and for an ulterior purpose, and so declared invalid. The question is fully discussed, and many prior de-

cisions of this court cited and quoted from. In the course of the opinion the court says (p. 240):

> "In some of the States, perhaps in most, the right to build and maintain gasworks is derived from the State, but subject to municipal control as to the use of the streets and the prices to be charged to consumers. In Ohio this price is regulated for stated periods. Could it be successfully maintained that after the erection of the works and the fixing of prices for a term of ten years, at the expiration thereof and exercising the right to fix prices for a new term, the council could arbitrarily, and with a view of compelling the sale of the works to the municipality or a rival company, fix the rate at a price below the cost of gas to the producer and at such a rate as to be ruinous to the business? In State ex rel. The Attorney General v. The Cincinnati Gas Light & Coke Co., 18 Ohio St. 262, it was held to be the legislative intention, in empowering city councils to regulate the price of gas, to limit such companies to fair and reasonable prices, and if in the colorable exercise of this power a majority of the members of the council, for a fraudulent purpose, combine to pass an ordinance fixing the price of gas at a rate at which they well know it cannot be manufactured and sold without loss, such an ordinance would impose no obligation on the company. This case was cited with apparent approval by Mr. Justice Matthews in de-

livering the opinion of this court in Yick Wo v. Hopkins, supra, and see Dillon Mun. Corp., 4th ed., Sec. 311."

In the recent case of Wilson vs. New, 243 U. S., 332, involving the validity of the act of Congress commonly referred to as the Adamson Act, it was assumed that even an act of Congress would be invalid, as wanting in due process of law, if it appeared that it had been enacted arbitrarily and without due consideration. On this subject the court says (p. 355):

> "The contention virtually is that, conceding the legislative power under the circumstances stated, to fix a standard of wages, such authority necessarily contemplates consideration before action, and not a total and obvious disregard of every right of the employer and his property—a want of consideration and a disregard which it is urged appear on the face of the statute, and which cause it therefore to amount to a decision without a hearing, and to a mere arbitrary bestowal of millions by way of wages upon employes, to the injury not only of the employer but of the public, upon whom the burden must necessarily fall. Upon the assumption that unconstitutionality would result, if there be ground for the propositions, let us test them."

Thereupon the court narrated the events which preceded, and the circumstances and conditions which surrounded the enactment of the statute, and

found, as a matter of fact, that due and deliberate consideration had been given, and an opportunity to be heard afforded, and that therefore the statute represented proper legislative and not merely arbitrary action.

In Manufacturers Light & Heat Co. vs. Ott, 215 Fed., 940, involving the validity of an order of the public service commission of West Virginia, it was said (p. 946):

> "The complainants contend with earnestness that they were denied due process of law, in that (1) their leading counsel was required by the commission to retire from the case, and in that (2) the governor of the state improperly interfered in the hearing, and the commission acted in subservience to his will. If these charges be established, then the hearing was inadequate and manifestly unfair, and it would be the imperative duty of the court to enjoin rates based on it. Interstate Commerce Commission v. L. & N. R. R. Co., 227 U. S. 88; Interstate Commerce Commission v. Baird, 194 U. S. 25."

Congress has delegated to the Interstate Commerce Commission the power to regulate rates, but this court has repeatedly held that a rate order made by that commission without due investigation, proper notice and hearing, and sufficient evidence to support it, is wholly void as an arbitrary and unconstitutional exercise of power, and without regard to the question whether the rates prescribed thereby are or are not confiscatory.

In Interstate Commerce Commission vs. Louisville & Nashville R. R. Co., 227 U. S., 88, 91, the court said:

> "A finding without evidence is arbitrary and baseless, and if the government's contention is correct, it would mean that the commission had a power possessed by no other officer, administrative body, or tribunal under our government. It would mean that, where rights depended upon facts, the commission could disregard all rules of evidence and capriciously make findings by administrative fiat. Such authority, however beneficently exercised in one case, could be injuriously exerted in another, is inconsistent with rational justice, and comes under the Constitution's condemnation of all arbitrary exercise of power. In the comparatively few cases in which such questions have arisen it has been distinctly recognized that administrative orders, quasi-judicial in character, are void if a hearing was denied; if that granted was inadequate or manifestly unfair; if the finding was contrary to the 'indisputable character of the evidence' (citing cases), or if the facts found do not, as a matter of law, support the order made (citing cases)."

In Interstate Commerce Commission vs. Illinois Central R. R. Co., 215 U. S., 452, 470, the court said:

> "Beyond controversy, in determining whether an order of the commission shall be

> suspended or set aside, we must consider * * * a proposition which we state independently, although in its essence it may be contained in the previous one, viz., whether, even although the order be in form within the delegated power, nevertheless it must be treated as not embraced therein, because the exertion of authority which is questioned has been manifested in such an unreasonable manner as to cause it, in truth, to be within the elementary rule that the substance, and not the shadow, determines the validity of the exercise of the power."

To the same effect see:

> Interstate Commerce Commission vs. Union Pac. R. R. Co., 222 U. S., 541, 547.
>
> Louisville & Nashville R. R. Co. vs. Garrett, 231 U. S., 298, 308.

The appellants, at pages 10 to 20 of their brief, cite authorities intended to indicate the reluctance of courts to declare confiscatory rates established by legislative action, and the presumption that rates so established are reasonable and non-confiscatory. But in the case at bar the act under consideration, as we have demonstrated, was not legislative but confessedly arbitrary. For this reason the authorities cited by appellants are wholly without application. That there is no presumption of the validity of this ordinance, or of the rates which it prescribes, is demonstrated by the authorities hereinbefore cited. Even though the act of the city council had been legisla-

tive in character (which it clearly was not), nevertheless, under the facts here presented, neither the ordinance nor the rates which it prescribes would be aided by any presumption of validity.

In Pennsylvania R. R. Co. vs. Philadelphia County, 220 Penn. Sta., 100; 68 Atl., 676, 679, the court, speaking of a rate prescribed by an act of the legislature, said:

> "The presumption in favor of the prescribed rate is no more than the ordinary presumption in favor of the constitutionality of acts of assembly. It has no special strength or sanctity; and in view of the public history of the passage of the Act of 1907, without investigation and in obedience to a popular agitation for the same rate, not only in Pennsylvania, but over the whole country, it might well be said that very slight evidence would rebut the presumption in this case."

In Henry L. Doherty, et al. vs. Toledo Railways & Light Co., and City of Toledo, the United States District Court for the Northern District of Ohio, on September 12, 1914, delivered an opinion, which has not been reported but is deemed of sufficient interest and importance to justify us in attaching to this brief, as Appendix A, p. 429, a reproduction, in print, of a certified copy thereof. The court was considering an ordinance enacted by the city council of Toledo reducing street railway rates. Upon the subject of presumption the court said (*infra*, p. 432):

> "This measure, not to go into effect for four months and not for three months after

the incoming of a new council and a new administration, was passed to adoption through three readings at one sitting by a council and urged by an administration whose friends had just suffered defeat at an election.

These circumstances suffice to start speculation upon the value of the presumptions. When, however, we find, as the testimony here shows without dispute, that, at the time this ordinance was passed and signed, the executive of the city was not only possessed of statistical information in most illuminative detail from its trusted expert, which, properly considered, showed that a three-cent fare was confiscatory, but that also the force of such statistics to this effect was pointed out in advice privately given in writing and orally by this expert to the executive, with reasons why a three-cent ordinance should not be passed, and, further, that the city had, in November, 1913, no evidence or light whereon to base a fixing of rate except that given it by its own chosen expert to the above effect, it does not take a very acute mind to see that these vaunted presumptions descend nearly to the level of mere legal figments."

We respectfully submit that the ordinance here in question and the rates which it prescribes are wholly void for the reason first assigned, and without regard to whether the rates are or are not so low as to be for that reason confiscatory.

Plainly, the Master was much impressed with the force of these contentions. But he found it unnecessary to determine them (Record, p. 120, finding 8). In reference thereto he said: "I do not deem it necessary to consider or decide this question, because the evidence clearly requires a finding that the ordinance is invalid even when the ordinary rules of law as to its validity are applied to the evidence," and thereupon stated that in considering the pleadings and evidence he had been guided by the following rules:

(a) That the ordinance and the rates fixed by it are presumed to be valid, reasonable and fair, and

(b) That the Water Company "has the burden of proving beyond any reasonable doubt" that said rates are in fact confiscatory.

We submit that said ordinance, and the rates which it prescribed, are, to say the least, aided by no presumption of validity. Nevertheless, on the issue of confiscation appellee met and amply sustained the heavy burden of proof which the Master thus laid upon it, and as the Master expressly held, established the fact of confiscation "beyond any reasonable doubt" and by evidence which "clearly requires a finding that the ordinance is invalid."

We submit, however, that if the contentions advanced in the foregoing portion of our brief are well founded, the issue of confiscation becomes in all its aspects merely moot, for the ordinance is, in any event, wholly invalid, and the decree to that effect must, in any event, be affirmed. If we are correct in this, then it also follows that it is quite unnecessary for this court to enter upon the serious and burdensome task involved in the investigation and determi-

nation of the respective contentions concerning the issue of confiscation.

III.

TO ESCAPE THE CHARGE OF CONFISCATION, THE RATES MUST WITH CERTAINTY YIELD SUFFICIENT, NOT ONLY TO COVER OPERATING EXPENSES, TAXES AND A PROPER DEPRECIATION ALLOWANCE, BUT ALSO TO PROVIDE, IN ADDITION, A FULL AND FAIR NET RETURN ON THE PRESENT FAIR VALUE OF THE PROPERTY DEVOTED TO THE PUBLIC USE. HOW THE NET RETURN WAS ASCERTAINED IN THIS CASE. APPELLANTS' CONTENTIONS IN THIS REGARD ANSWERED.

It is obvious that in the computation by which the net earnings are ascertained, the basic figure is the gross revenue obtainable under the ordinance rates, from which must be deducted (1) operating expenses, including the cost of repairs and ordinary maintenance; (2) taxes, and (3) an allowance for depreciation, to offset the loss caused by the wearing out and obsolescence of portions of the plant, which necessarily occurs in spite of proper repairs and adequate maintenance.

All of the factors of this problem were the subject of most careful and detailed investigation by the Master, were covered by the most comprehensive and specific proof, and each is disposed of by a definite finding in the Master's report (Record, p. 124, finding 13, and pp. 138 and 139, findings 49, 50 and 51).

The appellants (defendants below) did not file any exception nor assign any error directed to the Master's findings concerning either (1) the gross revenue under the ordinance rates; (2) the operating expenses; (3) the taxes, or (4) the net earnings. And their only exception or assignment of error relating to the depreciation allowance is that the allowance should not have been made, "as the same is included annually in the item of 'operating expenses'" (Record, p. 1136, exception 21st, p. 1155, assignment XXII), although the Master had necessarily expressly found that the same is not included annually, or at all, in the item of operating expenses, as to which finding there is no exception and no assignment of error. Appellants' contentions respecting these matters are mainly set forth at pp. 92 to 112 of their brief, although repeated references thereto will be found at many other places in their printed argument.

Briefly summarized, appellants' contentions appear to be as follows: (1) That any net return, no matter how small, in excess of the actual cost of conducting the business, is sufficient to escape the charge of confiscation; (2) that the proof respecting the several factors entering into the ascertainment of the net return was not sufficiently full and specific to justify the Master's findings. We submit that appellants are foreclosed upon both of these contentions. On the first, by repeated decisions of this and other courts; and on the second, because the facts have been found against them by the Master in a reference by consent. Those findings have not been attacked by any exception or assignment of error, and the evidence relating to these issues which was before the Master has not been brought to this court (see *supra*, pp. 37 *et seq.*).

Moreover, we submit with respectful confidence that even though this were a case (which it is not) wherein the presumption in favor of the validity of legislative action was operative, the proof submitted to the Master upon these issues was so overwhelming, specific and conclusive as not only to satisfy the Master "beyond a reasonable doubt" (Record, p. 120, Finding 8), but even to convince defendants (appellants) themselves. Doubtless this is the reason why no exception or assignment of error relating to these subjects was filed. It is not too much to say that defendants in the court below were so clearly convinced of the propriety of these allowances and determinations that they were conceded and became matters of agreement. Under these circumstances it comes with ill grace from counsel who have recently entered the case, and who did not participate at all in the proceedings before the Master, and are plainly unfamiliar therewith, to assert upon the confessedly incomplete record which they have brought to this court that these matters were not sufficiently proven. And yet appellants' brief is filled with such assertions, all of which are merely gratuitous, in direct conflict with the facts and utterly inexcusable. If counsel had participated in the proceedings before the Master, or had taken the pains to read the lengthy record of those proceedings, such assertions could not possibly be made in good faith. If counsel had even made themselves familiar with the incomplete record which they have brought to this court, they could not conscientiously advance these contentions. It follows that these assertions of counsel are either deliberately misleading, and intended so to be, or else they are the result of inexcusable ignorance, and so made with reckless disregard as to their truth or falsity.

1. *The Appellee Company Has an Absolute Constitutional Right to Just Compensation for the Use of Its Property by the Public, and to a Reasonable Net Return Therefor, Which Must Be Full and Fair and Commensurate with the Value of the Property Devoted to the Public Use.*

The Fifth Amendment to the Constitution of the United States provides, *inter alia:*

> "Nor shall private property be taken for public use without just compensation."

This, of course, is a limitation upon Congressional action only. But the Colorado Constitution contains a like provision in Article II, Section 15 (Revised Statutes 1908, p. 24) which provides, *inter alia:*

> "That private property shall not be taken or damaged for public or private use without just compensation."

And the Fourteenth amendment to the Constitution of the United States provides, *inter alia:*

> "Nor shall any state deprive any person of life, liberty or property without due process of law; nor deny to any person within its jurisdiction the equal protection of the laws."

These are the constitutional provisions which limit the power of public authority, whether it be state or federal, to take private property for public use. Whether the taking be physical seizure of the

corpus of the property, or whether it consist in leaving physical possession with the owner and requiring the use thereof to be furnished to the public at a fixed compensation, is immaterial; in either event the property is taken for public use, and such taking is prohibited unless accompanied by *just compensation*.

It amounts to a denial of the equal protection of the laws guaranteed by the Fourteenth amendment, because it results in the failure to afford to certain private property the protection which the Colorado Constitution quoted above requires to be extended to all. It is a deprivation of property without due process of law, contrary to the Fourteenth amendment, because it amounts to the transfer by legislative fiat (in this case by an arbitrary fiat not legislative in character) of the property of one citizen to the ownership or use of another, or to the public at large, without the return of any just equivalent, which is tantamount to confiscation.

For all of these reasons such taking, either of the corpus of the property or of its use, is, so far as state action is concerned, prohibited by the Fourteenth amendment. No distinction is made between the physical seizure of the property and the taking of the use thereof. They are controlled by the same principles and governed by identical provisions of the Constitution. In either event the compensation must be *just*. There can be no doubt that the just compensation required by the Constitution must be a full and perfect equivalent for the property taken, or for its use, if that alone be taken.

In cases of condemnation or seizure the just compensation is measured by the value of the property taken and is equivalent thereto. In cases where the

use of the property is taken (possession and title being left with the owner), just compensation is again measured by the value of the property whose use is taken, and is equivalent to a fair and full net return upon such value. It follows that the owner of the property whose use is taken has an absolute constitutional right, not only to *some* net return, but to a *fair* and *full* net return upon the entire value of all of his property devoted to the public use. Anything less than this would result in the taking of private property for public use without *just* compensation, and therefore a denial of the equal protection of the laws and a deprivation of property without due process of law.

These principles are conclusively determined by repeated decisions, and are no longer open to question. Our apology for again restating them, and for citing authorities in their support, is found in the fact that appellants in this case have again questioned them and advanced inconsistent doctrines long since exploded.

From the beginning there has been no doubt that the constitutional provisions quoted above prohibited the actual physical taking by public authority of the corpus of private property without due process of law, or without making full compensation for the entire value of the property so taken. But the application of these constitutional provisions to the efforts of public authority to regulate and reduce the charges imposed by the owners of private property for its use in the service of the public, is a matter of relatively recent development. This is not because any different principle was involved in such application, but because the effort of public authority to regulate and

reduce such charges is relatively modern. When the matter first came to the attention of this court there was some hesitation in applying these constitutional provisions in their full scope to the new situation.

Munn vs. Illinois, 94 U. S., 113.

The Granger Cases; Chicago, etc. R. R. Co. vs. Iowa, and other cases following, 94 U. S., 155.

But in reality, as this court has observed in later decisions, these early cases went only to the point of determining that the right of legislative control of rates actually existed. The extent of that control was not decided.

In the Railroad Commission cases, 116 U. S., 307, 331, while the right of legislative control of rates was reaffirmed, a limitation on that right was plainly indicated when it was held that the legislative power does not extend to doing that "which in law amounts to a taking of private property for public use *without just compensation*, or without due process of law."

In Chicago, etc., Ry. Co. vs. Minnesota, 134 U. S., 418, 458, it was held that "if the Company is deprived of the power of charging *reasonable rates for the use of its property*," it is actually deprived of the property itself without due process of law, and "in so far as it is thus deprived while other persons are permitted to receive reasonable profits upon their invested capital, the Company is deprived of the equal protection of the laws."

In Reagan vs. Farmers' Loan & Trust Co., 154 U. S., 362, decided May 26, 1894, this court, speaking through Mr. Justice Brewer, made the matter very

clear. The previous decisions of the court were thoroughly reviewed, and it was held that the principles applicable to a rate case are the same as those which govern in a condemnation case, or when the seizure is of the corpus of the property. The fact that the railroad business, once entered upon, cannot be abandoned at will, was emphasized (this, of course, is equally true of the waterworks business), the contention that the railroads, if they did not like the rates imposed, could withdraw from the business, was sternly rebuked (p. 409), and the court concludes as follows (p. 410):

> "The equal protection of the laws, the spirit of common justice, forbids that one class should by law be compelled to suffer loss that others may make gain. If the state were to seek to acquire the title to these roads under its power of eminent domain, is there any doubt that constitutional provisions would require the payment to the corporation of just compensation—that compensation being the value of the property as it stood in the markets of the world, and not as prescribed by an act of the legislature? Is it any less a departure from the obligations of justice to seek to *take not the title but the use for the public benefit at less than its market value?*" (Italics ours.)

In Ames vs. Union Pacific, 64 Fed., 165, 176, decided November 12, 1894, Mr. Justice Brewer was within a few months after his decision in the foregoing case called upon to determine at Circuit another

rate litigation. He restated in even more emphatic language the doctrine enunciated in the preceding case, again held that a rate case is governed by exactly the same principles as a condemnation case, and that the owner of property taken or used is entitled to full and just compensation therefor, which, in either event, is measured by its value, no matter how or at what cost the property was acquired, and even though it may have been originally donated by the Government and so acquired without cost; and the learned Justice again emphasized the permanent character of a railroad investment, and the fact that it cannot be abandoned at will.

In Smyth vs. Ames, 169 U. S., 466, decided March 7, 1898, the foregoing decision of Mr. Justice Brewer was, on appeal, in all things affirmed. Mr. Justice Harlan delivered the opinion of the court, and after a full review of the authorities, announced in the most definite and unmistakable language the doctrine to which the court has ever since consistently and by repeated decisions unswervingly adhered. Among other things, the court says (p. 546):

> "But it is equally true that the corporation performing such public services, and the people financially interested in its business and affairs, have rights that may not be invaded by legislative enactment, in disregard of the fundamental guaranties for the protection of property. The corporation may not be required to use its property for the benefit of the public without receiving *just compensation* for the services rendered by it." (Italics ours.)

And as is clearly evident from the remainder of the opinion, what is meant by "just compensation" is a full and fair net return upon the present value of the property devoted to the public use.

As is manifest, the underlying thought in the foregoing decisions is that the property of a public utility, although embarked in a service in which the public is interested, nevertheless remains private property, as this court has frequently decided. (Interstate Commerce Commission vs. Chicago Great Western Ry., 209 U. S., 108, 118, 119.) The owners of a property may not be deprived thereof without due process of law, and neither the corpus of the property itself, *nor its use*, can be taken under public authority, or under guise of regulation, without due process of law, or without just compensation. The fact is emphasized that the private property necessary to afford the public service is invariably extensive, costly and permanently installed. Once embarked in the enterprise, it cannot be withdrawn without the loss of practically the entire investment, and without imposing upon the community served a hardship which in the case of a water-works plant would amount to a public calamity and possibly communal extinction. Moreover, the permanency and cost of the necessary plant are particularly emphasized in a water-works. That is conspicuously true in this semi-arid region. Therefore the principle of the foregoing decisions is peculiarly applicable. Once invested, the property cannot be withdrawn. When public authority reduces rates below a point where they afford a reasonable net return upon the fair value of the property devoted to the public use, such use is necessarily taken for the benefit of the public

without due process of law and without just compensation.

As was said by Mr. Justice Brewer in an early case (Chicago & Northwestern Ry. Co. vs. Dey, 35 Fed., 866, 880):

> "For a government, whether that government be a single sovereign or one of the majority, to say to an individual who has invested his means in so laudable an enterprise as the construction of a railroad, one which tends so much to the wealth and prosperity of the community, that, if he finds that the rates imposed will cause him to do business at a loss, he may quit business, and abandon that road, is the very irony of despotism. Apples of Sodom were fruit of joy in comparison."

In Shepard vs. Northern Pacific (Minnesota Rate Cases), 184 Fed., 765, it was said:

> "The value of property, of investment in every form, is measured by the value of its use, not by its use divorced from the value thereof."

In the Minnesota Rate Cases, 230 U. S., 352, the principle thus enunciated was affirmed, the court saying (p. 434):

> "But the state has not seen fit to undertake the service itself; and the private property embarked in it is not placed at the mercy of legislative caprice. It rests se-

> cure under the constitutional protection, which extends not merely to the title, but to the right to receive *just compensation* for the service given to the public." (Italics ours.)

And from the remainder of the opinion it is plainly evident that what is meant by "just compensation" is a fair and full return upon the reasonable value of the property devoted to the public use.

We do not attempt to cite the many cases in which this doctrine has been repeatedly reaffirmed.

In Cole & Coke Ry. Co. vs. Conley, 67 W. Va., 129; 67 S. E., 613 (a case which has received the approval of this court: Norfolk & Western Ry. Co. vs. Conley, 236 U. S., 605, 608), the principle is thus stated:

> "The taking of private property for public purposes without compensation to the owner thereof, is termed 'confiscation,' and the right to confiscate property can be legally exercised only against the public enemies, as a military measure. Citizens are protected from it in this country by the constitutional guaranties, just referred to. An attempt on the part of the state to take the corpus of a citizen's property for public use, without compensating him therefor, under color of law, is a void and wrongful act, confiscatory in form only, not in reality, because contrary to law, but called confiscatory for convenience. As the right to use property for any lawful purpose to *the ex-*

tent of the realization therefrom of a return or reward, commensurate with the reasonable and just value of such use, is an element of property, property itself pro tanto, since, without the right of such use, it would be wholly or partially valueless, according to the extent of the restraint upon its use, *deprivation of the use thereof, or denial of the power to earn such reasonable and just return or reward,* by the use thereof, in whole or in part, without compensation therefor, amounts to such wrongful taking thereof, and, therefore, to confiscation within the meaning of the decisions in cases of this kind. To constitute such confiscation, the taking need not extend to the corpus of the property nor total deprivation of reward for the use thereof. If the law renders it impossible to obtain from the use of the property *a reasonable and fair return,* it is confiscatory in its operation and effect, though valid on its face. The extent of such deprivation is not the test. Whether a statute is thus confiscatory does not depend upon the *amount it takes,* in violation of the Constitution, or the extent to which it interferes with the right of use of property, guaranteed by the organic law. *It is void, if it so takes any at all or so interferes to any extent whatever.* It is condemned, not by the extent of the pecuniary injury wrought, but by its transgression of constitutional limits, its invasion of a constitutional right, as sacred to corporations as to the humblest citizen of the

> land, and justly so, for the reason, among others, that the property of corporations is in fact the property of citizens, and the law cannot and ought not, in its ultimate results, to favor one citizen or class of citizens over another." (Italics ours.)

It follows inevitably, and has been determined by conclusive judicial precedent, that appellee is, as a matter of constitutional right, entitled to receive just compensation in the form of a fair and full net return upon the fair value of its property devoted to the public use. If the rates in question here afford less than this they are beyond doubt confiscatory. What rate of return is the least which will escape the charge of confiscation is a question which we shall take up later on.

2. *The Present Is Not One of Those Rare Cases Where Fair Rates, Determined upon the Foregoing Principles, Would Exceed the Value of the Service to the Consumer.*

The Master found (Record, p. 140, finding 53):

> "The evidence shows the service of the Water Company is of such value as to render fair to the public rates which are sufficient to yield a fair return on the reasonable value of the property devoted to the use of the public."

This finding was not excepted to, nor is any error assigned thereon. It is therefore conclusive.

In the preceding portion of this brief we have demonstrated that under rates prescribed by public authority, the utility has an absolute constitutional right to a fair and full net return upon the value of the property devoted to the public use. To this rule there is but one possible exception.

In Wilcox vs. Consolidated Gas Co., 212 U. S., 19, at 52, and in San Diego Land & Town Co. vs. Jasper, 189 U. S., 439, 442, 446, 447, the court intimated, but did not hold, that to the foregoing absolute rule there could be only one exception, applicable to those cases where the property constituting the plant had so enormously increased in value, or the plant was so overbuilt or misplaced as to render rates determined upon the foregoing principle greater than the value of the service to the consumer.

But this is not such a case. The Master's finding quoted above conclusively so determines. No claim is here made that this plant is overbuilt or misplaced, or that its value, as determined by the Master, is so great as to render fair rates measured thereby greater than the value to the public of the service which it gives.

The Master's finding is amply sustained by undisputed evidence.

The evidence shows without dispute that the rates which were being imposed by the Company at the time when the present attempt to reduce them was made, were far less than the reasonable value of the service to the consumer.

Mr. Allen Hazen, chairman of the former board of appraisers, whose qualifications are stated in the record (Record, p. 226), gave careful study to the

question of Denver rates, that being one of the duties imposed upon the former board of appraisers by the ordinance and contract under which they were acting. His extended experience in such matters, his intimate knowledge of conditions prevailing in Denver and in other cities, and the eminent fairness which he displayed in his testimony in this case, render the statements of this distinguished engineer of controlling importance. Speaking of Denver rates, he says (Record, p. 234):

> "The actual value of water service rendered is enormously greater than the rates charged. Rates could be established to amortize nine or ten million dollars in from 5 to 7 years, and still be fair to the consumers."

> (p. 236): "Existing rates would have to be nearly doubled to amortize the loss of nine or ten million dollars which will occur from the city's building its own plant."

Moreover, the engineers appointed by the Public Utilities Commission (Fellows, Van Diest and Allen), in the course of the investigation which culminated in their report of January, 1914, had free access to the Company's records, and from them determined the gross earnings, operating expenses and net earnings for each year of the Company's life (1895 to 1913, inclusive), and set forth these facts in detail in the written report which they filed (Exhibits A-65 and A-106, neither of which is produced here). They likewise testified concerning them when called as witnesses in this case (Record, pp. 427, 428, 429,

902). These engineers found, reported and testified that the net return to the Company even upon the going rates, and upon assumptions as to value, and other basic facts which plainly did the Company injustice, had throughout the Company's history been grossly inadequate and they strongly recommended against any present attempt to reduce the rates, even though the City should, as they also strongly recommended, purchase the plant. The present attempt to reduce the rates followed immediately upon the heels of this report.

Upon this subject the evidence is all to one effect, and the fact is established beyond peradventure of doubt.

3. *Appellants' Contention that Any Return, No Matter How Small, in Excess of Actual Operating Cost, Will Avoid the Charge of Confiscation, Wholly Untenable.*

In appellants' brief the assertion is made, and frequently reiterated, that if the ordinance rates afford any return, no matter how small, in excess of actual operating cost, the rates are compensatory and not confiscatory, and the court is not at liberty to determine whether such net return is in fact insufficient. (See appellants' brief, pp. 10, 17, 19, 22, 89, 94, 100 to 112.)

If counsel really mean what they apparently in plain words say, the assertion is amazing. It is an astonishing thing that one who is intellectually honest can at this date advance such a doctrine.

Since 1894, when Reagan vs. Farmers' Loan & Trust Co., 154 U. S., 362, was decided, and, beyond

question, since 1898, when Smyth vs. Ames, 169 U. S., 466, was decided, no doubt whatever has existed that what the utility was entitled to receive was not only *some* net return upon the present value of its property, but a *fair and full* net return thereon. The authorities cited in subdivision 1 of this portion of our brief (*supra*, p. 95), as well as a multitude of other decisions which might be cited, and with which all should now be familiar, demonstrate this to a certainty.

The courts have clearly recognized that confiscation could as well occur by permitting an unfairly low rate of return upon a fair valuation as by permitting a fair rate of return upon an unfairly low valuation. Fair rate of return is as important as fair value, and for precisely the same reason.

The theory that any reward in excess of actual cost of operation was sufficient to escape the charge of confiscation was entertained in certain quarters in the era of the Granger cases, but was entirely exploded more than twenty years ago.

What that fair rate of net return upon the present fair value must in the case of the Denver Union Water Company be, to avoid a charge of confiscation, is more fully dealt with in a later portion of this brief. What that fair rate of return should in any particular case be is dependent upon circumstances, many of which are recited by this court in Wilcox vs. Consolidated Gas Co., 212 U. S., 19, decided in 1909. In that case it was expressly held that the Consolidated Gas Company of New York, recognized by the court as the most favorably situated and least hazardous public utility investment in this country, was

entitled to a net return upon the present value of the entire property, at the rate of 6 per cent. per annum, and that anything less than that would be confiscatory. If this be true of the Consolidated Gas Company, having practically a perpetual monopoly of the gas business in the largest city in America, what must be the necessary rate for The Denver Union Water Company under the conditions prevailing here? To say that a net return of at least 8 per cent. is requisite, is to make an extremely modest claim.

The authorities cited and apparently relied upon by appellants in this connection either do not at all support appellants' contention, or else are decisions made by the lower Federal courts or by the state courts, prior to the time when the doctrine which is now firmly settled had been clearly enunciated by this court.

The cases of Reagan vs. Farmers' Loan & Trust Co., 154 U. S., 362, and Water District vs. Water Co., 99 Maine, 371, refer to the fact that the value of the service to the consumer must be considered. As we have already demonstrated, this was considered in the case at bar, and it was conclusively shown and expressly found that rates sufficiently large to produce a fair net return upon present fair value certainly would not exceed the value of the service to the consumer.

San Diego Water Co. vs. San Diego, 118 Cal., 556, is several times cited by appellants and is quoted from at page 16, *et seq.*, of their brief. Appellants' quotation and their deductions therefrom are taken not from the opinion of the court but from a specially concurring opinion which, upon the proposi-

tion here involved, was in fact a dissenting opinion. The San Diego case was decided by the Supreme Court of California in 1897. The court consisted of seven members. As shown by the head-notes (118 Cal., 558), four of the judges, being a majority of the court, concurred in holding:

> "The question of just compensation is a judicial question, to be determined in the ordinary course of judicial proceedings, and the Water Company is entitled to a net compensation at least equal to the lowest current rate of interest on the basic value of its plant properly ascertained."

Three of the judges, being a minority of the court, concurred in holding:

> "The court has no power to determine any limit of just compensation, but only to inquire whether some compensation, however small, is allowed, and the question of the extent or limit of such compensation is for the municipal body alone to determine."

It is upon the latter or minority opinion that appellants rely, and from which they quote. Not only is the opinion relied upon that of the minority, and in effect a dissenting opinion, but it was delivered prior to the decision of this court in Smyth vs. Ames, and the principle which it announces is in direct conflict with that decision and many later decisions of this court.

Wilcox vs. Consolidated Gas Co., 212 U. S., 19, is referred to by appellants, but the reason therefor

is not apparent. In that case this court, after commenting on the safety and desirability of the investment, in which the element of risk was reduced to the minimum, said (p. 49):

> "Under the circumstances, the court (below) held that a rate which would permit a return of six per cent would be enough to avoid the charge of confiscation, and for the reason that a return of such an amount was the return ordinarily sought and obtained on investments of that degree of safety in the City of New York. Taking all facts into consideration, we concur with the court below on this question, and think complainant is *entitled* to six per cent on the fair value of its property devoted to the public use." (Italics ours.)

The decision last mentioned is, of course, destructive of appellants' contention, and is the foundation of our argument to the contrary.

Knoxville vs. Knoxville Water Co., 212 U. S., 1, much relied upon by appellants, is cited in support of this proposition, at page 105 of their brief. The Knoxville case and the Consolidated Gas case were decided on the same day, and the two opinions must be read together to determine the attitude of the court.

In the Knoxville case the decree was reversed, not because the court below had required too large a rate of net return, but because the proof as to the value of the property and as to the amount of the net return under the ordinance rates had been in-

sufficient and unsatisfactory. The court does not rule at all upon the question as to what rate of return is requisite, but expressly refrains from so ruling. All that is said upon this point is (212 U. S., 17):

> "The net income in any event would be substantially six per cent, or four per cent after an allowance of two per cent for depreciation. * * * We cannot know clearly that the revenue would not much exceed that return. We do not feel called upon to determine whether a demonstrated reduction of the income to that point would or would not amount to confiscation."

Moreover, in the Knoxville case it appeared (p. 9) that in determining valuation no deduction whatever had been made for accrued depreciation. Manifestly, this deduction should have been made, as this court held. And as this court also held, if the least possible deduction on that account had been made, the net return as found by the court below would have been equivalent to a rate of return in excess of 6 per cent.

Upon this subject the court said (p. 10):

> "It is enough to say that there should have been a considerable diminution, sufficient at least to raise the net income found by the court above six per cent. upon the whole valuation thus diminished. If, for instance, the master's valuation should be diminished by $50,000 allowed for depreciation, the net

> earnings *found by him* would show a return of substantially 6.5 per cent."

And in the succeeding portions of the opinion it is plainly demonstrated that the net earnings found by the Master were certainly much lower than those which would be actually realized.

In the Knoxville case it is perfectly evident that with the valuation decreased and the net earnings increased to the extent required by this court's demonstration, the resultant net return would have been very much greater than the 6.5 per cent.

But it is plain, from what was held by this court on that very day in the Consolidated Gas case (212 U. S., 49, 50), quoted above, that if in the Knoxville case it had been clearly shown that the net return would not have been at least 6 per cent, the rates would have been declared confiscatory.

Chicago & Northwestern Co. vs. Dey, 35 Fed., 866, cited and quoted from at page 18 of appellants' brief, was a decision by Mr. Justice Brewer at Circuit, rendered in 1888. It is in many respects an instructive and valuable opinion, and has hereinbefore been referred to by us. But upon the point now under discussion it is in direct conflict with later decisions of this court, including some announced or participated in by Mr. Justice Brewer himself.

In preceding pages we have traced the growth of the present doctrine, and the progress of the decisions by which it has been firmly fixed (*supra*, pp. 95 *et seq.*).

Cedar Rapids Water Co. vs. City of Cedar Rapids, 118 Ia., 234; 91 N. W., 1081, was decided in 1902, long prior to the decision of this court in the Con-

solidated Gas case (212 U. S., 19), and its many other decisions by which the prevailing doctrine has been fully settled. It is sufficient to say that the decision of the Iowa court, in so far as it tends to support appellants' contention, which it does but slightly, is in conflict with these.

Steenerson vs. Great Northern Ry. Co., 69 Minn., 363; 72 N. W., 713, cited at page 102 of appellants' brief, was decided in 1897, and is therefore prior even to the decision of this court in Smyth vs. Ames (169 U. S., 466). It is in the same situation as the Iowa decision last mentioned, and the same comments are applicable.

We submit that appellants' contention mentioned in the foregoing headline is without the slightest foundation or excuse either in principle or authority.

4. *Appellants' Contention that Gross and Net Earnings under the Ordinance Rates Not Sufficiently Proven Is Wholly without Merit and in Conflict with the Record.*

Upon this phase of the case the contention outlined in the foregoing heading is the principal, if not the only, contention made by appellants. The method of argument pursued is to assert baldly, without any reference to the record, that this or that was or was not shown by the evidence, followed by the challenging demand that if such be not the case, it is the duty of appellee to point it out. The basis of the argument is the false assumption that because rates were prescribed by a municipal ordinance, therefore a strong presumption of their validity exists which can only be overcome by the most complete, specific and

convincing proof. As we have already pointed out (*supra*, pp. 56 *et seq.*), the ordinance here involved is, to say the least, aided by no such presumption.

But we are now in an appellate court, wherein appellants are the moving parties, and are seeking to have set aside and reversed the finding and decree of the Special Master and of the court below. The presumption is that such finding and decree are correct. Certainly, there is no presumption that they are erroneous. The burden rests upon the appellants to clearly point out and amply demonstrate the errors which they claim. That burden is not satisfied by making an unfounded assertion in emphatic language, and then calling upon appellee to disprove it. And yet such is the method pursued throughout appellants' argument.

As we have already demonstrated, the objections which appellants seek to make are not open upon this record; but if they were, the result must be the same.

We submit with respectful but perfect confidence that every detail pertaining to the gross earnings and the net return under the ordinance rates was shown by proof which was specific to the most minute particular and conclusive in every respect. The Master found that it demonstrated the fact "beyond any reasonable doubt." (Record, p. 120, Finding 8.)

For the purpose of collecting and presenting to the Master the facts pertaining to this branch of the case, appellee employed Thomas Cheyne, a certified public accountant connected with the firm of Haskins & Sells of New York City. He made a careful study of the financial records of the Water Company covering the entire period of its existence from the date of its organization in 1894 to the date when Mr.

Cheyne testified before the Master. This investigation consumed more than eight months (Record, p. 346). Mr. Cheyne's conclusions were based upon the Company's vouchers, which he had carefully examined and checked, and which constituted the original sources of information. The facts ascertained in this way by Mr. Cheyne were set forth in a series of carefully prepared, elaborate and detailed exhibits, only a few of which have been brought to this court. These exhibits were:

Exhibit Z (Record, p. 926), a detailed statement of the actual cost, not including overhead charges, of additions, extensions and betterments made since the appraisement of 1908.

Exhibit A-55 (not included in this record), a detailed statement, by years, of expenditures, covering the actual cost of additions, extensions and betterments to the property of the Water Company in each year from the organization of the Company in 1894 to March 31, 1914. This exhibit showed with great particularity the precise items. And in each instance the exact nature and cost of the work.

Exhibit A-56 (Record, p. 990), a detailed statement of gross earnings, operating expenses, taxes and net earnings, without the deduction of any depreciation allowance, for the 19 years ending October 31, 1913.

Exhibit A-57 (not included in this record), a detailed statement of gross and net earnings under the ordinance rates for calendar year ending April 30, 1915, based on the business done, and the operating expenses and taxes actually paid by the Company in the preceding fiscal year, which ended October 31, 1913. This exhibit was prepared and produced be-

fore the results of the fiscal year ending October 31, 1914, were known. Months later, when Mr. Cheyne testified in rebuttal, Exhibits A-73, A-74 and A-107 were prepared and presented by him after the actual results of the fiscal year ending October 31, 1914, had been ascertained. The exhibits last mentioned show the actual results during a period of six months (May 1 to October 31, 1914), to which the ordinance rates were applicable and are based upon the business actually done, and the operating expenses and taxes actually incurred and paid during said period.

Exhibit A-58 (not included in this record), a detailed statement of gross earnings, operating expenses, taxes, and consequent net earnings for the six-months period ending April 30, 1914, and also for the six-months period ending April 30, 1913.

Exhibit A-73 (not included in this record). As stated above, this exhibit was prepared and presented after the actual result of the first six months' operation under the ordinance rates was ascertainable. It sets forth in detail for said six-months period ending October 31, 1914, the gross earnings, both under the leaflet or Company rates, and under the ordinance rates, the operating expenses and taxes actually incurred and paid, and the resultant net revenue for said six-months period, both under the leaflet or Company rates and under the ordinance rates.

Exhibit A-74 (not included in this record), a detailed statement of the gross earnings, operating expenses, taxes, and consequent net earnings for the fiscal year ending October 31, 1914, and also for the fiscal year ending October 31, 1913.

Exhibit A-107 (Record, p. 1080), a detailed statement of gross earnings, operating expenses, taxes and net earnings for the fiscal year ending October 31, 1914; also a detailed statement of the gross and net earnings under the ordinance rates for the year beginning May 1, 1914, and ending April 30, 1915, based, as to the first six months of said year, upon the business actually done, and the operating expenses and taxes incurred and paid during said period; and as to the second six months of said year, based upon the business done, and the operating expenses and taxes incurred and paid during the corresponding six months of the preceding year.

Exhibit A-108 (Record, p. 1080), a complete and detailed statement by years for the five years ended October 31, 1914, of the cost of repairs charged to and included in the operating expenses as set forth in the other exhibits which had been presented by Mr. Cheyne.

Exhibit 17 (not included in this record), an itemized statement of office, legal and general expenses of the Water Company, charged to operating accounts, and to addition, extension and betterment accounts, in each of the twenty years of the Company's life. Exhibit 17 was prepared at the request of and introduced by the appellants.

An inspection of these exhibits would demonstrate the care with which they were prepared and the detailed information which they furnished.

Mr. Cheyne was called as a witness, and the exhibits mentioned were presented by him and fully explained. His testimony in chief begins at page 346 of the record. His testimony in rebuttal, given months

later, will be found at pages 798 and 898 of the record.

As stated above, these exhibits were based upon the original vouchers of the Company, all of which had been inspected by Mr. Cheyne. Obviously, these vouchers, covering, as they did, a period of more than twenty years, were exceedingly numerous. It was not possible, nor would it have been permissible, to produce them all before the Master. Consequently, while Mr. Cheyne was on the stand, and as these exhibits were being introduced, the offer was made and constantly kept open to produce the voucher or vouchers covering any charge or item embraced in these exhibits which the defendants (appellants here) might see fit to question or call for. The defendants took advantage of this offer and made many such requests, all of which were promptly complied with. This the record now before the court demonstrates (Record, pp. 351, 352, 801).

In addition to that, at the conclusion of Mr. Cheyne's testimony, and after the detailed exhibits which he had prepared were introduced, counsel for defendants (appellants here) requested, and plaintiff (appellee here) promptly consented, that the Special Master should appoint a competent accountant of his own selection, who should, as the representative of the defendants, examine the books, accounts and vouchers of the Water Company upon which Mr. Cheyne's exhibits and testimony had been based, and so check and determine the accuracy of said testimony and said exhibits (Record, p. 801). Accordingly, the Master selected and appointed Horace Hilton Mitchell, a certified public accountant, residing at

Colorado Springs, who made said investigation and check, filed a written report thereof and testified as a witness for defendants. His testimony will be found at page 902 of the record. His report, which is specific, detailed and comprehensive, is Defendants' Exhibit No. 72, and with its attached exhibits covers pages 1101 to 1114 of this record. The result of Mr. Mitchell's examination of the vouchers was to verify in every respect the testimony and the exhibits proffered by Mr. Cheyne. Mr. Mitchell concludes his written report as follows (Record, p. 1102):

> "In conclusion I would state that I have not experienced or noticed the slightest inclination or disposition on the part of anyone connected with the Company to conceal anything appertaining to the accounts in question. I wish here to record my appreciation of the universal courtesy extended to me, and the assistance rendered in the way of information, when requested, by all the officers and employes while making the examination and verification."

In addition, Mr. Metcalf, whose high qualification as an operator and administrator of water works are set forth in the record, made an investigation of the gross revenue, operating expenses and net earnings under the going rates for each year of the entire period of the Company's life; also a forecast respecting like items for ensuing years, to and including 1923; and the result is set forth in Exhibit C, at pages 105 to 107. He also prepared and produced another exhibit (not included in the present record), giving

the same information in great detail, with the items fully particularized (Exhibit A-20, Record, p. 269). Moreover, the engineers appointed by the Public Utilities Commission (Fellows, Van Diest and Allen), in the course of the investigation which culminated in their report of January, 1914, had free access to the Company's records, and from them determined the gross earnings, operating expenses, and net earnings for each year of the Company's life (1895 to 1913, inclusive), and set forth these facts in detail in the written report which they filed (Exhibits A-64 and A-106, neither of which is produced here). They likewise testified concerning them when called as witnesses in this case (Record, pp. 427, 428, 429, 902).

These engineers found, and stated in their written report, that the net return to the Company, even under the going rates and upon assumptions as to value, and other basic facts, which plainly did the Company injustice, had throughout its history been grossly inadequate, and in said report they strongly recommended against any present attempt to reduce the rates, even though the City should, as they also strongly recommended, purchase the plant.

The record demonstrates beyond peradventure of doubt that all facts pertaining to the inquiry were brought before the Master; that everything pertinent to this subject shown by or obtainable from the records of the Company, was freely produced, and that all of them were thoroughly investigated and checked by the defendants, through an expert accountant representing the defendants, but at their request, and, with the consent of the plaintiff, chosen by the Master, who was given free access to every record which the Company possessed. How else can

such facts as these be proven? In what respect is evidence thus adduced lacking in particularity? In what respect has appellee sought to conceal or failed to disclose any item of information relevant to the inquiry or sought by defendants? In the face of this record, how can counsel for appellants conscientiously make the extravagant assertions upon this subject with which their brief abounds? We submit that the evidence more than sufficed to satisfy the strictest rule concerning the burden of proof. It is certain that it not only plainly justified the Master's findings, but also that it served to convince the defendants and those who represented them in the court below.

The authorities cited by appellants and relied upon in this connection are wholly inapplicable.

Chicago, etc., Ry. Co. vs. Wellman, 143 U. S., 339, cited at page 21, and again cited and quoted from at page 95, of appellants' brief, involved a friendly suit, wherein there was no evidence whatsoever upon the subject here involved, the whole matter being covered by a stipulation of facts between friends, both interested in reaching the same result. It was obvious that the suit had been devised and was brought as a test case, in the interest of the railroad. Neither the state nor the public participated therein, and the proceeding was not adversary in any sense of the word. Under such conditions it is no wonder that Mr. Justice Brewer, speaking for this court, employed the language quoted at page 95 of appellants' brief. But what has that to do with such a situation as is here presented? Here the proceeding was in every sense adversary and bitterly contested at every step. The City, the Public Utilities Commission and the

public were represented by able counsel. Nothing was conceded, and every fact was shown by the most specific proof which could be produced. The records of the Company were thrown open to the defendants and carefully checked and examined on their behalf. The result is the Master's finding. What more can appellants ask, and what better or more specific proof could possibly have been made?

5. *Appellants' Contention that the Ordinance Rates Should Be Submitted to a Practical Test, Wholly Untenable.*

The contention outlined above is repeatedly urged by appellants (their brief, pp. 21, 106, 107, 112, 118). It is without the slightest foundation or excuse, and in direct conflict with the findings of the Master, and with express admissions by defendants and stipulations of the parties in the court below.

Appellants ignore the fact that nine months had elapsed between the date when the new rates by the terms of the ordinance were effective and the date when the evidence before the Master was closed, and that the result of the operations during this period was clearly shown and the Master's finding expressly based thereon (Exhibits A-73, A-74, A-107, Record, p. 1080, and Finding 50, Record, p. 139). The exhibits referred to above show the actual revenues which would have accrued under the ordinance rates for the first six months during which they would have been in effect.

Appellants ignore the fact that by paragraph eighteenth of the bill of complaint (Record, p. 77) it was expressly alleged that the number of con-

sumers, the quantity of water consumed, and the consequent gross revenue will be no greater, and the operating expenses, taxes and other costs no less in the future than in the past, and that these allegations are not at all denied in the answer, and therefore stand confessed. (Equity Rule 30.)

Appellants ignore the fact that when appellee undertook to prove the truth of said allegations in its bill, by the testimony of witnesses, defendants (appellants here) objected to such testimony as immaterial and irrelevant, because the fact was not disputed, and expressly stipulated and agreed in the presence of the Master "that no contention is made, or will be made, that a reduction of the schedule of rates would cause an additional consumption of water or a larger income even at the lower rates." Upon this concession, and because of this stipulation, the Master excluded the testimony (Record, p. 792; side number 989).

It must be borne in mind that in Denver, water is furnished, and by the new ordinance was required to be furnished, under a flat schedule of rates, whereby the consumer, upon the payment of a certain sum, is entitled to take all the water he needs for a specified period. It is obvious that under this plan increased consumption does not result in increased revenue.

Under such circumstances, and in view of the fact that the net return, shown as an absolute certainty to be the result of the reduced rates, is so far below what is necessary to escape the charge of confiscation, we respectfully submit that there is no possible excuse for requiring the plaintiff to sacrifice its

property for the purpose of useless experiment. It must be remembered that such an experiment is to be made solely at the expense of the plaintiff and at a cost to it of several hundred thousand dollars per annum, which it can never recover back. Upon any fair value which it is possible to spell out of the testimony in this case, the yield of the ordinance rates is far below the line of confiscation. There is no possible justification for further experiment.

In support of this contention appellants refer to Knoxville vs. Knoxville Water Co., 212 U. S., 1, but that case is distinguishable from this upon almost every conceivable ground. There the decree was reversed because of obvious and gross errors which had occurred in determining the valuation, and also in determining the yield of the new rates. There the ordinance became effective March 30, 1901 (p. 6). The suit was begun nine months after its effective date and tried considerably later. In the meantime the company's gross income had largely increased. Notwithstanding this, the decision of the court below was based solely on the operations of the fiscal year preceding the enactment of the ordinance (p. 14).

Here the Master, after having been fully informed concerning the result of the Company's operations for every year during the twenty years of its life, including its operations for the first six months after the effective date of the ordinance rates, reached his conclusions, basing them largely upon the result of operations during said six months' period. Moreover, the evidence here shows that during said six months the gross revenue did not increase, but, on the contrary, remained stationary, or possibly de-

creased; and it is fair to state that said condition continues to the present day.

In the Knoxville case (p. 9) value was determined without the deduction of any accrued depreciation, and this court found (p. 10) that if the most reasonable deduction for accrued depreciation had been made, the net earnings found by the Master "would show a return of substantially 6.5 per cent."

In the case at bar an ample deduction for accrued depreciation was made, the sufficiency of which appellants do not question, with the result that the net earnings found by the Master (Record, p. 139, Finding 51) show a return of only .0364.

In the Knoxville case (p. 12) it appeared that in determining the net earnings under the ordinance rates the Master had improperly reduced them, in a large amount, by deducting a discount not required or permitted by the ordinance. Of course, no such thing occurred in the case at bar.

In the Knoxville case it appeared (p. 12) that the Master in determining the reduction in earnings caused by the ordinance had improperly applied such reduction to rates paid by users outside of the city, not affected by the ordinance. In the case at bar (Record, pp. 138, 139, Finding 49) the Master took the opposite and proper course, and in addition took into account a possible increase of revenue on certain items to the amount of about $16,000.00, which the new ordinance was said to permit, although it was very doubtful whether it would result or could be collected.

In the Knoxville case (p. 15) there was no attempt to show the result of operations during the

period succeeding the enactment of the ordinance, although many months had elapsed. In the case at bar the evidence was full and complete concerning the period which had elapsed since May 1, 1914, the date when the ordinance by its terms became effective.

We submit that under no possible circumstances can the Knoxville case be regarded as a precedent supporting appellants' contention.

Appellants likewise refer to Wilcox vs. Consolidated Gas Co., 212 U. S., 19. This also was a case in which no evidence whatsoever was given concerning the result of operations subsequent to the date when the rates complained of were prescribed. It concerned a gas company whose product was sold at a fixed price per thousand cubic feet, and so required to be sold under the new rates, which reduced the price. Obviously, in such a case an increased consumption necessarily results in increased revenue. Moreover, after the valuation had been reduced, as this court held that it must be, the net return, as found by the court below, substantially equalled, if it did not exceed, six per cent. per annum. Under these circumstances the court suggested that the case was an appropriate one for a practical test of the rates, but said (p. 42):

> "Of course, there may be cases where the rate is so low upon any reasonable basis of valuation that there can be no just doubt as to its confiscatory nature, and in that event there should be no hesitation in so deciding and in enjoining its enforcement, without waiting for the damage which must inevitably accompany the operation of the business under the objectionable rate."

Plainly, the case cited affords no support for appellants' contention.

Both this court and the lower Federal courts have repeatedly refused to subject the utility to the inevitable loss which must result from the so-called practical test.

Seaboard Airline Co. vs. Railroad Commission, 155 Fed., 792, 808.

Central of Georgia vs. Railroad Commission, 161 Fed., 925, 991.

Love vs. A., T. & S. F. Ry. Co. (C. C. A., 8th Cir.), 185 Fed., 321, 326.

Ames vs. Union Pacific, 64 Fed., 165.

Smyth vs. Ames, 169 U. S., 466.

Arkansas Rate Cases, 187 Fed., 290, 309.

Arkansas Rate Cases, 230 U. S., 553.

In the Minnesota Rate Cases (230 U. S., 352) there had been no practical test of the rates. When the cases came to this court the decrees were reversed as to certain of the railroads, because of manifest errors which had been made in the determination of value and in the apportionment of said values, and of operating expenses between interstate and intrastate business. But the lack of a practical test was in no wise criticised.

But in the case of the Minneapolis & St. Louis Railroad Co. (230 U. S., 469), where, also, there had been no practical test, and where the valuation had been determined, and it and the expenses apportioned in exactly the same way as in the other cases, this court nevertheless affirmed the decree enjoining the

new rates, because (p. 472) the rate of net return which they permitted was manifestly very low. It is interesting to observe that the rate of net return so condemned was approximately that found to exist and condemned as confiscatory in the case at bar.

In Lincoln Gas & Electric Light Co. vs. City of Lincoln, 223 U. S., 349, suit was brought before the ordinance became effective, and, of course, without trial of the rates. The trial court (182 Fed., 926) denied the injunction. But this court (223 U. S., 357) reversed the decision and approved the continuance in effect of the temporary injunction which had been allowed at the beginning.

In the recent Arkansas Rate Cases (Boyle vs. St. L. & S. F. R. Co., 222 Fed., 539; Rowland vs. Boyle, 244 U. S., 106) suit was brought before there had been any practical test of the rates. They were never actually put in effect. But a test period of two months (November and December, 1913) was employed for the purpose of determining the effect of the prescribed rates upon the company's net return. (In the case at bar the test period was six months.) Upon the result of this test the rates were adjudged confiscatory by the lower court.

When the case reached this court (244 U. S., 106) the decree was affirmed, the sufficiency of the test and the propriety of the method adopted by the court below being in all respects approved. Upon this subject the court said (p. 109):

> "We agree with the District Judge that the two months of investigation afforded a basis for argument as to constant conditions. * * *

(P. 110.) The railroad, after getting the actual returns at the three-cent and two and one-half-cent passenger rate, and the freight rates allowed by the court, deducted the sums necessary to bring the revenue down to what it would have been had the state rates been followed. It is objected that this does not allow for the increase of travel that would follow the reduction. The railroad replies, and the court below found, that the increase is mainly at the expense of interstate revenue, when the combined local rates are less than the interstate one. Whether this exhausts the matter or not, we are of opinion that upon this record the supposed increase is too conjectural properly to affect our conclusion. The direct effect of the reduction is plain. The remote one is at best a guess."

The test applied in the case at bar was more extensive and therefore more conclusive than in the case last cited. It covered a period of six months instead of two months, and, as pointed out above, there is no room for the contention that the lowering of the rates would result in an increase of revenue.

6. *Gross Revenue.*

The Master found (Record, p. 138, finding 49) that the gross return for the year beginning May 1, 1914, and ending April 30, 1915, under the ordinance rates, would have been $1,093,615.45. In arriving at this figure he excluded the slight revenue from the

ranches, because he had excluded the value of the ranches from the rating base. In this figure he included all uncollected earnings which had accrued during the year in question. Moreover, so that no possible injustice might be done to appellants, he added the sum of $16,560.40, which possibly, though not probably, might, under the new ordinance, have been collected on certain items. He included without reduction all sums paid by consumers, or under rates, not affected by the new ordinance.

This finding of the Master is not excepted to, nor is it the subject of any assignment of error. We submit that it is conclusive and not open to question by appellants.

But passing this, the Master's finding is supported by most positive and convincing proof, which in the court below was entirely undisputed.

The sole criticism here made is that the Master took the year 1914 as the only basis of anticipating the gross returns of the Company. The Master had before him the entire financial history of the Company, including the result of its operations, for each of the 20 years of its life, and including also a forecast made by experienced and informed witnesses, extending for several years into the future. Doubtless the Master, in reaching his conclusion, gave consideration to all of these matters.

Even if we assume, as appellants do, that the Master's finding was based upon the business done in the fiscal year 1914, it is clear that appellants' criticisms are totally unjustified. The year 1914 means the fiscal year ending October 31, 1914. The ordinance here in question was effective May 1, 1914.

Obviously, therefore, the fiscal year in question included six months of the period during which the ordinance would have operated. The other six months of said year immediately preceded the date when the ordinance became effective. What more appropriate period could be adopted for the test in question?

Appellants say (their brief, p. 93) "that the gross earnings of the Company for the year 1914 were $47,067.30 less than for the year 1913, and $48,341.66 less than for the year 1912." This is absolutely untrue.

Exhibit A-107 (Record p. 1080) shows for the fiscal year ending October 31, 1914, gross earnings on the leaflet or Company rates of $1,323,366.65. Exhibit A-56 (Record, p. 990) shows gross earnings upon the same rates for the fiscal year ending October 31, 1913, of $1,354,242.33, and for the fiscal year ending October 31, 1912, of $1,368,558.90. These were the gross earnings from water service, and, obviously, they alone are to be considered. The Master's finding was required to be and was confined to such gross earnings. The figures set forth above indicate that the gross earnings for 1914 were $30,879.68 less than for 1913, and $45,192.25 less than for 1912; but, as is shown by said Exhibit A-56, they equalled those for 1911 and exceeded those for any previous year in the Company's history. But the evidence shows without dispute (Record, pp. 800, 801, Exhibit A-107, note (a), Record, p. 1080) that the delinquent water license payments at the end of the fiscal year 1914 amounted to $37,619.70, as compared with $6,152.55 at the end of the fiscal year 1913, the latter amount being about the normal amount of such delinquencies. In the note at the foot of said Exhibit A-107 it is stated:

> "Had the amount of such delinquent water license payments been the same at the close of such fiscal year (1914) as it was at the beginning, and the difference been collected by the Company during the intervening period, the gross earnings from water licenses, and consequently the net earnings for the year ending October 31, 1914, would appear approximately $31,467.15 greater, and those for the fiscal year ending April 30, 1915, (under the new ordinance rates) approximately $25,173.72 greater."

It is therefore clear that to make a just comparison between the gross earnings for 1914, as shown by Exhibit A-107, and the gross earnings for the year 1913 and preceding years, as shown by Exhibit A-56, $31,467.15 must be added to the gross earnings for 1914. With this addition made, the result is $1,354,833.80 as gross earnings under the Company's leaflet rates for the year ending October 31, 1914. This sum slightly exceeds the gross earnings for the year 1913, approximately equals those for the year 1912, and is substantially in excess of those for any preceding year in the Company's history.

In determining net earnings under the ordinance rates the Master added the sum of $25,173.72, on account of delinquent water license payments, in accordance with said note at the foot of said Exhibit A-107 (Record, p. 138, Finding 49).

It thus appears that appellants' assertion is in direct conflict with the facts. This is a fair example of the many reckless and baseless statements with which appellants' brief abounds.

Appellants also say in this connection that the only evidence concerning gross earnings is Exhibit A-56, and the testimony of Thomas Cheyne authenticating said exhibit. This also is untrue, as we have demonstrated in that portion of our brief which immediately precedes. The facts were shown not only by Exhibit A-56, but also by Exhibits A-73, A-74, A-107 and by a number of others. These exhibits were fully explained by Mr. Cheyne and other witnesses, and they and the Company's records upon which they rested were carefully investigated and checked by Mr. Mitchell, the expert chosen by the Master, at the request of the defendants and as their representative. Mr. Mitchell's testimony and his report appear in this record (p. 902, Exhibit 72, pp. 1101, 1114). Mr. Mitchell by his testimony and his report sustained in every particular the facts shown by plaintiff's (appellee's) exhibits, and the testimony of its witnesses.

7. *Operating Expenses and Taxes.*

The Master found (Record, p. 139, finding 50) that the reasonable and necessary allowance for normal operating expenses for the year beginning May 1, 1914, and ending April 30, 1915, was $347,845, and for taxes, $116,950. This finding of the Master was not excepted to, nor is it made the subject of any assignment of error. We submit that it is conclusive and not open to question by appellants. Nevertheless appellants (their brief, pp. 94 to 100) vigorously attack the allowance for operating expenses. That for taxes is left untouched.

Speaking of the allowance for operating expenses, appellants say (their brief, p. 94):

"There is nothing in the record to justify this finding of the Master."

This statement is wholly untrue. In the portion of this brief which immediately precedes (*supra*, pp. 115 *et seq.*) the method by which these facts were determined, and the conclusive proof submitted to the Master, have been discussed in detail. We need not here repeat what was there said. Appellants' assertion quoted above is in direct conflict with the facts shown by the record, totally unjustifiable and quite inexcusable.

Appellants point out that for the year beginning May 1, 1914, and ending April 30, 1915, the bill of complaint estimated the probable operating expenses as $333,045.06, whereas the Master found the actual operating expenses for said year to be $347,845. The bill was filed on April 29, 1914, before the commencement of the year in question, at a time when, of course, the actual facts could not be known. The statement in the bill was a mere estimate. The Master's finding was made after the expiration of the year in question, and in the light of specific evidence concerning actual results during said year.

Appellants assert that the only evidence in the record upon the question of operating expenses is that of Mr. Cheyne, evidenced by Exhibit A-56, and that said witness estimates the operating expenses for the year in question at the same amount mentioned in the bill of complaint. This is absolutely untrue. Exhibit A-56 was prepared and presented at an early stage in the proceedings before the Master, and prior to the time when it was possible to get actual results for any portion of the year in question.

Months later Cheyne testified in rebuttal and presented other exhibits (A-73, A-74, A-107, A-108), which cover the subject fully and show the operating expenses, based upon actual results. These were checked by Mr. Mitchell, and the exhibits attached to his report (Exhibit 72) show the same facts. The actual operating expenses thus shown for the year in question are $473,276.99. From this is deducted $114,751.15, covering certain extraordinary expenses incurred in that year, which must be paid for out of the proceeds of the rates, but which were assumed to be properly chargeable to a depreciation and contingent reserve fund. This leaves actual net operating expenses for the year in question $358,525.84 (Record, p. 1080, Exhibit A-107). The Master's allowance on this account was $347,845 (Record, p. 139). In view of the undisputed testimony, the Master's allowance was extremely conservative.

Upon this subject the witnesses all agree that a much larger allowance than that made by the Master would be reasonable.

Mr. Freeman said (Record, p. 200):

> "I believe that the sum of $350,000 a year would be a fair allowance for the ordinary operation and maintenance expenses, exclusive of taxes and depreciation, on this plant for the next four or five years."

Mr. Holman said (Record, p. 213):

> "From my experience in operating water works, I should want to spend at least $400,000 a year for ordinary operation and

maintenance of this property. That does not include any allowance for depreciation or for taxes."

Mr. Hazen said (Record, p. 230):

"It is my judgment that the ordinary normal operation and maintenance of the plant can be conducted for $350,000 a year at the present time, not including extra expenses for litigation and in connection with special troubles, which might run anywhere from $20,000 to $100,000 a year.

In looking over the accounts of the company, I am satisfied that there are some accounts in the last few years that have not been charged into operation, that really should have been, such as special litigation, and matters of that kind, of which it has had an unusual amount in the last few years."

Mr. Hazen's allowance for operating expenses was exclusive of taxes, and also exclusive of an allowance for depreciation, which he thought should be not less than $150,000.

Appellants assert (their brief, p. 94) that had the Master taken the year 1912 as his basis, the rate of return would have been .0406, or had he taken the year 1913, the rate would have been .0374. This assertion is based upon the assumption, already shown to be erroneous, that the gross revenue in those years exceeded that in 1914.

Appellants (their brief, pp. 96 and 97) again reiterate the totally false and utterly inexcusable

statement that the evidence concerning the Company's operating expenses was lacking in completeness and detail. This we have sufficiently discussed.

Appellants, at pages 97 to 100 of their brief, discuss certain items appearing in what they designate as Exhibits C and D. These exhibits are not those of appellee (plaintiff below), but of appellants (defendants below). They were prepared and presented by defendants' expert accountant witness, Mr. Mitchell, and appear in the record as a portion of his report (Record, pp. 1101, 1108, 1109).

In so far as appellants' criticisms are based upon an alleged lack of detail, our answer thereto is hereinbefore set forth (*supra*, pp. 115 *et seq.*).

As to the item "Pumping Works," it is said that no explanation is given as to why this cost is greater in 1914 than in some preceding years. The statement is untrue. The difference was fully explained as being due to the increased cost of coal and labor (Record, p. 801).

As to the item "Reservoirs," it is asserted that it is not stated whether it is for repairs of reservoirs, or what. This is untrue. Exhibit A-107 (Record, p. 1080) explains in detail what this item is for, and to what extent it consists of repairs and replacements, and the testimony is even more specific (Record, p. 799).

Moreover, Exhibit A-108 (Record, p. 1080) clearly sets forth in detail the exact amount for repairs included in each of the items referred to, for each of the years 1910 to 1914, inclusive.

As to the item "Conduits," it is asserted, "Whether this is for renewals or building of new conduits, the evidence is silent." This is absolutely

untrue. Exhibits A-107 and A-108 (Record, p. 1080), the testimony of Mr. Cheyne (Record, pp. 798, 802, and pp. 898 to 900), concurred in by the defendants' expert, Mr. Mitchell (Record, p. 902, Exhibit 72, pp. 1101 *et seq.*), completely refute it.

Appellants' criticisms of the items "Office Expenses," "Stable Expenses," "Stable and Auto Service," "Legal Expenses" and "General Expenses" (their brief, pp. 98 and 99) consist, in the main, of the reiterated assertion that the proof in respect to these was not sufficiently specific. This we have already fully answered (*supra*, pp. 115 *et seq.*).

As to the intimation here and elsewhere made that possibly exorbitant salaries were paid, we call attention to the fact that this was one of the questions which Mr. Mitchell, defendants' expert accountant, carefully investigated, and his finding is set forth in his report (Record, p. 1102), from which it appears that the total of all salaries of executive officers is $60,100. In addition to this, as appellants' counsel would have known if they had participated in the hearing below, the details of the salaries paid, how much to each, and for what services, were fully ascertained by Mr. Mitchell and reported to the Master and to the defendants. They were so plainly moderate that the defendants did not see fit to question them in any way.

As to appellants' comments on the item "Legal Expenses" (their brief, p. 99), it is sufficient to say that the details of this item were ascertained by Mr. Mitchell and reported (his report, Exhibit F, Record, p. 1113). From this report and Exhibits F and G thereto, it is obvious, as had been shown by the evi-

dence, that none of the expenses of this rate case had been charged into operating expenses (see Exhibit B, pp. 1106 and 1107, and Exhibit A-107, Record, p. 1080), but had been eliminated therefrom as more properly payable out of a fund furnished by the annual allowance for depreciation and contingent reserve. Plainly, however, they were proper operating expenses, and some part at least, if not all of them, should have been covered by the operating expenses charged as such in the year in which they were incurred.

But appellants say that said item "Legal Expenses" may include some part of the expenses of the litigation which eventually came to this court (229 U. S., 123). This the record fails to show. However, upon the assumption that such is the case, appellants say:

> "Certainly, the Water Company would not have the right to charge the City with money it expended in litigation with the City."

Why not? Certainly, the Company has a right to defend its property against unwarranted attack, or that which it in good faith believes to be unwarranted attack, and would be remiss in its duty if it failed so to do.

The decisions of the two lower courts in the litigation mentioned conclusively establish the Company's good faith. The expenses of such litigation must be paid. How are they to be paid except out of the earnings of the plant? And if they are so paid,

is it not clear that they are properly expenses of operation? The authorities definitely so hold.

> In re Third Avenue Bridge Co., Public Utilities Repts. Ann., 1916-A, 942.
>
> Citizens of La Junta vs. Arkansas Valley Ry. Light & Power Co. (Colorado Public Utilities Commission), Public Utilities Repts. Ann., 1916-D, 1076, 1088.

As to the statement that the operating expenses allowed by the Master were greater than those which had occurred in some of the preceding years, as shown by Exhibit A-56 (Record, p. 990), it is sufficient to say that the witnesses in this case all testified to the increase in cost of labor, supplies, and almost every other item which goes to make up operating expenses. It is a matter of common knowledge, of which this court will take judicial notice, that this increase of cost has been progressing for several years, and still continues. Not only this, but the plant which was operated in 1914 was greater than that which the Company had in 1911. As shown by Exhibit Z (Record, p. 926), between October 31, 1910, and March 31, 1914, more than a million dollars had been invested in additional construction, and, as is obvious, the larger the plant the greater the cost of operation.

Finally appellants assert (their brief, pp. 99, 100) that:

> "It is quite likely that a part of the items contained in the tabulation (of operating expenses) are items which have gone to the repair of the Company's works, for

> replacements, betterments or extensions of its system."

It is certainly proper that operating expenses should include the cost of repairs and ordinary maintenance. On the other hand, replacements are properly chargeable to depreciation, and betterments and extensions to the capital account. But the evidence before the Master clearly demonstrated that the operating expenses contained no charges for replacements, betterments or extensions (Exhibit A-107, notes B, C, D and E, Record, p. 1080; Exhibit B, notes B, C, D and E, Record, pp. 1105, 1106; Record, pp. 898, 899, 900). Exhibit A-108 (Record, p. 1080) is a complete and detailed statement of the cost of repairs charged into operating account.

We submit that the Master's allowance for operating expenses is not only conclusive, but also that it is fully sustained by the evidence, and that appellants' criticisms thereof are totally without justification.

8. *Depreciation Allowance.*

The Master found (Record, p. 139, finding 50) that the reasonable and necessary allowance for normal depreciation of the plant of the Water Company for the year beginning May 1, 1914, and ending April 30, 1915, was $140,000. This finding was not excepted to, nor was it made the subject of any assignment of error, except as follows:

> "Nothing should be allowed for 'Annual Depreciation,' as the same is included annually in the item of 'Operating Expenses.'"

(Record, p. 1137, exception 21st, p. 1155, assignment XXII.)

The limited character of this exception and assignment is manifest. By its express terms the allowance for depreciation is not objectionable, nor is it objected to, unless its allowance constitutes a duplication of what has already been allowed by way of operating expenses. But appellants do not argue this exception or assignment at all. The reference thereto is merely casual (appellants' brief, pp. 91, 92). The argument upon the subject of depreciation allowance (appellants' brief, pp. 85 to 90) is of an entirely different character, and consists of criticism of the amount allowed and of the supposed method by which it was determined. These questions are not open to appellants. If they were, appellants' contentions are wholly untenable.

The nature of the depreciation allowance, and the necessity that rates should provide it, is no longer open to question.

> "Before coming to the question of profit at all, the Company is entitled to earn a sufficient sum annually to provide not only for current repairs, but for making good the depreciation and replacing the parts of the property when they come to the end of their life. The Company is not bound to see its property gradually waste, without making provision out of earnings for its replacement. It is entitled to see that from earnings the value of the property invested is kept unimpaired, so that at the end of any

> given term of years the original investment **remains as it was at the beginning.** It is not only the right of the Company to make such a provision, but it is its duty to its bond- and stockholders, and in the case of a public-service corporation, at least, its plain duty to the public."
>
> Knoxville vs. Knoxville Water Co., 212 U. S., 1, 13.

In the Knoxville case the allowance for depreciation was two per cent. upon the entire valuation of the property. The allowance made by the Master here is about one per cent. The allowance made by the Master is amply supported by the testimony of many witnesses, including those for the defendants. Mr. Freeman (Record, p. 200) fixed it at $168,112; Mr. Holman (Record, p. 213), at $180,000; Mr. Hazen (Record, p. 230), at $150,000, *"with no allowance for contingencies;"* Mr. Metcalf (Record, pp. 263, 282, 900), at $168,000.

All of these witnesses stated definitely that the allowances testified to by them did not at all cover the cost of repairs or ordinary maintenance. All of them made a clear distinction between the depreciation allowance and operating expenses, and all testified that operating expenses did and depreciation allowance did not cover the cost of current repairs and ordinary maintenance, and that the depreciation allowance did and operating expenses did not cover the cost of replacements and renewals. (Record, pp. 347, 348, 799-801, 896, 898, 899-901.)

The testimony of defendants' witnesses was equally definite. The engineers of the Public Utilities

Commission stated in their report (Record, p. 71) that one per cent. upon the entire valuation was a fair annual allowance for depreciation, in addition to a net return of seven per cent. Mr. Van Diest, their spokesman, testified to the same effect when called as a witness for defendants (Record, pp. 428, 438).

This rate of one per cent. per annum, if applied to the net valuation found by the Master, after deduction of accrued depreciation ($13,415,899, Record, p. 123), results in an annual allowance of more than $134,000, or substantially the same as the Master's allowance. But the engineers of the Public Utilities Commission applied this rate of one per cent. to the gross reproduction cost or gross value, without deduction of accrued depreciation, and, as so applied, testified to the fairness of the allowance. The gross reproduction cost, or gross value, as found by the Master, without deduction of accrued depreciation, is $14,736,869 (Record, pp. 122, 123). Applied to this figure, as the engineers of the Public Utilities Commission say it should be, the annual rate of one per cent. testified to by them produces an annual allowance of $147,368, which is substantially in excess of the allowance made by the Master.

At pages 86 to 91 of their brief appellants discuss supposed objections to the Master's allowance for depreciation, which are not covered by any exception or assignment or specification of error. Moreover, this discussion is based upon assumptions of fact, not only unsupported by the record, but quite in conflict therewith. For example, on page 86 they assert:

> "It seems reasonable to say that the estimated life of the units, taking the average, will be fifty years from May 1, 1914."

There is no such evidence in this record. The testimony before the Master was quite to the contrary.

Again, on the same page it is asserted that in the year ending October 31, 1914, the amount "evidently included in operating expenses for repairs and renewals" was in excess of $96,000. This is untrue, as the exhibit to which they refer clearly shows (Record, p. 1080, Exhibit A-108). According to that exhibit, and Exhibit A-107 which immediately precedes it (Record, p. 1080), the actual amount charged into operating expenses in the year 1914 for repairs and maintenance was $68,661.39, arrived at by deducting from the figure mentioned by appellants the sum of $27,505.11 for items of replacement and renewal, properly chargeable to the depreciation account.

At page 87 of their brief appellants present a computation, in which they divide the total accrued depreciation, deducted by the Master from the gross reproduction cost of the existing units, by 20, which they assume to be the average age, in years, of those units, from which they conclude that, during said 20 years, depreciation in said units has actually progressed at the average annual rate of $66,048.50. But this computation is based upon false assumptions and is utterly misleading. There is no foundation in this record for the assumption that the average age of the units is 20 years. Such assumption is in direct conflict with the evidence which was before the Master. It may fairly be assumed from such evidence that the

average age of the whole investment in the plant is about, though considerably less than, 20 years, but this is quite a different thing from the average age of the units now existing, for said total investment has produced not only the existing units of the plant, but also many others which have heretofore utterly disappeared, because they were worn out or became obsolescent.

The accrued depreciation found by the Master ($1,320,970) relates only to elements of the plant which now exist. To determine the entire depreciation which has actually occurred, we must add to this the value of the property hitherto totally depreciated, and therefore eliminated. This is obviously true and was fully explained. (Record, pp. 263, 273, 301.) In the court below this was shown by undisputed evidence to be not less than the sum of $1,261,000 (Exhibit C, pp. 98 to 100; Defendants' Exhibit 14, not produced here, and Record, pp. 273, 301). If this be added, as it must be, a total accrued depreciation of at least $2,581,970 is shown, which would give to appellants' computation a very different result.

Assuming that the average age of the investment has been 20 years, this gives an average annual depreciation of $130,000. But this ignores the fact that this plant is constantly growing and is much larger now than it was 20 years ago, and also ignores the fact that the more extensive the plant the greater the amount of annual depreciation, even though the rate in percentage remains the same. (Record, p. 278.) It also ignores the fact that the units of the plant depreciate more rapidly toward the end of their useful life than at the beginning. This was conclusively

shown by the testimony before the Master (Record, p. 900).

Giving due weight to these considerations, it clearly appears that while, as the result of such computation, $130,000 per annum appears to be the average rate of actual depreciation, yet, to reach that average, the actual amount of depreciation in each of the early years of said twenty-year period, when the plant was less extensive and the units young, must have been much less than that, and the actual amount of depreciation in each of the later years of such twenty-year period, when the plant was much more extensive, and many of the units older, must have been and must be much greater. It follows that appellants' computation, applied to correct bases, clearly demonstrates that the Master's allowance of $140,000 for the year beginning May 1, 1914, and ending April 30, 1915, was extremely conservative.

Appellants at page 87 of their brief ask why the Master, in bringing down his valuation from November 1, 1913, to May 1, 1914 (Record, p. 123), deducted as depreciation for said six-months period only the sum of $60,000, when his annual allowance on account of depreciation was $140,000. The reason for this clearly appears on the face of the Master's report, for, as he states, this is the amount of the depreciation actually occurring in said six-months period, "less additions" to the plant actually made during the same six-months' period. (See also Record, p. 138, Finding 47.) And the evidence before the Master clearly demonstrated that the cost of these additions had been approximately $10,000. (See Exhibit Z, Record, p. 926.)

Appellants at pp. 88 and 89 of their brief present other computations, based upon these assumptions: (1) That the average remaining useful life of the units of this plant is fifty years; (2) that the Master's depreciation allowance was upon the sinking fund basis, with interest at four per cent., compounded annually. As to the first assumption, as we have already pointed out, it is not only unsupported by this record, but in direct conflict with abundant and undisputed testimony which was before the Master. As to the second assumption, the Master's report does not indicate that his annual allowance for depreciation was calculated upon the sinking fund basis; on the contrary, it appears to represent the actual amount of depreciatioon which, in his judgment, would occur in said year. In his Finding No. 13, Table 2 (Record, p. 124), it is referred to as "Actual Depreciation." And in bringing down his valuation from November 1, 1913, to May 1, 1914, he determines the accrued depreciation for said six-months period by deducting from $70,000 the sum of $10,000, which was the actual cost of additions, extensions and betterments made during said period (Record, p. 123; also Exhibit Z, Record, p. 926; also Finding 47, Record, p. 138).

Appellants at page 89 of their brief comment on the fact that the witnesses who described the sinking fund method of determining depreciation, did so upon the assumption that the moneys in the sinking fund would draw interest at the rate of four per cent. per annum, compounded annually, and then assert that if this is a sufficient return upon such an investment, it ought to be a satisfactory rate of net return, when

we come to consider the charge of confiscation made against the ordinance rates. The suggestion is clearly without force. The assumption in respect to the sinking fund is that it will be invested so safely as practically to eliminate the element of risk. Money so invested, as is well known, will not command more than four per cent. per annum, and such an investment is radically different from an investment in the business of supplying Denver and its inhabitants with water.

Appellants at pages 89 to 91 of their brief present further computations of like character to that set forth on page 87, relating to certain selected classes of the property embraced in the plant. From these they attempt to draw the conclusion that the average annual rate of depreciation applied by the Master to these respective classes was less than the rate of depreciation for the year in question, as measured by his annual depreciation allowance. But these computations are based upon the same false assumptions, and are subject to the same criticism as the one on page 87. Moreover, they relate to certain selected classes, and not to the whole property. It may well be that the classes so selected embrace the longest-lived property in the plant, and that which suffers the least annual depreciation. It may also well be that the abandoned property which, as we have shown, must be taken into account, largely came from these selected classes.

Finally, at page 91 of their brief, appellants devote less than half a page to the only point covered by any exception or assignment of error, i. e., that the Master's allowance for depreciation is already

covered by his allowance for operating expenses, and therefore constitutes a duplication of costs.

Appellants in this connection make no references to the record. Their argument, if it may be called such, consists merely of a bald statement, and is in fact of such slight force and so inconsequential, as fairly to indicate an abandonment by them of the only point which, in any event, they are entitled to urge relative to the depreciation allowance.

In this connection they again assert that in the year 1914, $96,000 was expended for repairs and renewals, and charged into operating expenses. As we have already shown, this is absolutely false (Record, p. 1080, Exhibit A-107, notes (b), (c) and (d); Exhibit A-108). As a matter of fact, the evidence before the Master demonstrated abundantly and without dispute that the charges made to operating expenses in the exhibits presented for his consideration, included nothing whatever for renewals or replacements, and covered only current repairs and ordinary maintenance. (Record, pp. 347, 348, 799-801, 896, 898, 899-901.)

The witnesses who testified concerning the necessary annual allowance for depreciation repeatedly stated that the amounts mentioned by them did not at all cover current repairs and ordinary maintenance, and were intended to cover only the loss caused by such depreciation as constantly and necessarily occurs in spite of proper current repairs and adequate ordinary maintenance. (Record, pp. 200, 213, 230, 263, 282, 900.)

The distinction between current repairs and the depreciation which they do not prevent has been clearly pointed out by this court.

> Knoxville vs. Knoxville Water Co., 212 U. S., 13.

This subject was most thoroughly gone into before the Master, and the evidence was comprehensive, complete and conclusive. It was shown without dispute, and established beyond question, that the separate allowances made by the Master for operating expenses and for depreciation allowance do not overlap, and constitute no duplication of costs. Indeed, the fact that the Master has made separate allowances is tantamount to an express finding that no such overlapping exists, and we respectfully submit that such finding is conclusive.

As pointed out above, the Master's allowance for depreciation is approximately one per cent. of the depreciated value of the property as found by him. It is considerably less than one per cent. of the value of said property, without deduction for depreciation.

In Knoxville vs. Knoxville Water Co., 212 U. S., 1, the allowance for depreciation was two per cent. upon the gross value of the property as found by the Master, without deduction for accrued depreciation. This court did not criticise the amount of said allowance.

In Lincoln Gas & Electric Light Co. vs. City of Lincoln, 223 U. S., 349, this court reversed the decision of the court below which (p. 360) had allowed a sum for annual depreciation equivalent to more than one and one-half per cent. upon the entire value of the

whole plant, including non-depreciable elements. The company claimed that this allowance was too small. Evidently this court was impressed with the claim, for it reversed the decree, remanding the case, with directions to refer it to a skilled Master, and saying (p. 364):

> "It can be readily seen that the amount to be annually set aside may be such as to forbid rate reductions, because of the requirement of such a fund."

In Cedar Rapids Gas Co. vs. Cedar Rapids, 223 U. S., 655, the court below (144 Ia., 426; 120 N. W., 966, 973) had provided for an annual depreciation allowance on sinking fund basis of 1.7 per cent. of the entire value of the whole plant. This court affirmed the decision of the state court (which had dismissed the company's bill without prejudice), but said (p. 670):

> "We, perhaps, should have adopted a rule as to depreciation somewhat more favorable to the plaintiff; or, it may be, might have allowed this or that item that the state court struck out. But there is nothing of which we can take notice in the case that could warrant us in changing the result, or in saying that the plaintiff did not get as much as it could expect, when leave was reserved for it to try again."

In Van Dyke vs. Geary, 244 U. S., 39, 48, it appeared that:

> "The Commission decided that the net return to the owner upon the value of the property employed should be at the rate of at least ten per cent., after allowing an annual depreciation charge of *three and one-half per cent.*" (Italics ours.)

In Whitten on Valuation of Public Service Corporations, Vol. 1, Secs. 480 *et seq.*; Vol. 2 (1914), Secs. 1323 to 1334, the authorities upon this subject are collected and quoted from, which show the sums and percentages provided by way of depreciation allowance by various courts and commissions. These demonstrate that the allowance here made by the Master is extremely conservative.

9. *Net Earnings.*

The Master found (Record, p. 139, Finding 51) that the net earnings, or net return, possible under the ordinance rates would be $488,820. To this finding there was no exception, nor is it made the subject of any assignment of error. We submit that it is conclusive. But, beyond that, we submit that it was shown with the accuracy and certainty of a mathematical demonstration that the net return under the ordinance rates could not possibly exceed the amount stated in the Master's findings. Every factor entering into the ascertainment of the net return was conclusively established by positive, definite and specific proof taken from the Company's records, which were checked and verified by the defendants. None of these factors was made the subject of any exception or assignment of error. So conclusive was the proof that this phase

of the case was not even debated by defendants (appellants here) in the extensive arguments before the Master and in the lower court. Plainly, the result was so certain and so positively shown that it was not open to debate. It is not too much to say that defendants themselves, and their counsel in the court below, were convinced of the accuracy of the items and the propriety of the charges and allowances. We are therefore justified in asserting that the Master's findings as to gross earnings, operating expenses, taxes, depreciation allowance and the consequent net earnings were so clearly right that, before the Master, in the lower court and in this court, until appellants' brief was filed, they were concurred in by defendants.

In arriving at his conclusions in this regard the Master resolved every doubt in favor of the defendants (Record, p. 138, Finding 49). He included in gross earnings not only that which was earned and collected, but also the sum of $25,173.72, which was earned but not collected, and possibly not collectible. He included in gross earnings the further sum of $16,560.40, because under the new ordinance certain rates might possibly be increased so as to yield that amount, although it was, to say the least, doubtful whether such increase could be made. He included in gross earnings the entire amount paid or payable by consumers outside of the city, under the leaflet or going rates, without application of the reduction prescribed by the ordinance. He eliminated from operating expenses items aggregating more than $114,000 (Record, p. 1080, Exhibit A-107), and did not take them into account in fixing his depreciation allowance, although they were plainly and properly chargeable to one or the other of these accounts. His

total allowance for operating expenses was substantially less than that testified to by experienced and well-informed men as the necessary and proper amount. His allowance for annual depreciation was substantially less than the sums which these same witnesses testified would be necessary for that purpose, and completely left out of account the obvious necessity of providing a contingent reserve fund to cover unusually large expenditures made in any one year, properly chargeable to operation, but which it was advisable to distribute over a series of years. Illustrations of this occurred in said Exhibit A-107. In short, he made the gross earnings as large and the deductions therefrom as little as the evidence would possibly permit. If injustice was done, it was not the defendants who suffered. Certain it is that the amount found by the Master ($488,820) is the greatest amount of net earnings which by any possibility could have been realized under the ordinance rates. Therefore, this important factor in the computation by which the confiscatory or non-confiscatory character of the ordinance rates is to be determined should be and will be hereinafter dealt with as conclusively determined and finally fixed.

IV.

ON THE ISSUE OF CONFISCATION, APPELLANTS' CONTENTIONS CONCERNING VALUATION ARE MOOT. THE AMOUNT OF NET RETURN HAVING BEEN CONCLUSIVELY DETERMINED, THE VALUATION MIGHT BE REDUCED TO ACCORD WITH EVERY CONTENTION OF APPELLANTS, AND YET THE RATE OF NET RETURN MEASURED THEREBY WOULD STILL REMAIN CONFISCATORY. EIGHT PER CENT. PER ANNUM IS THE LEAST RATE OF NET RETURN WHICH IN THIS CASE CAN ESCAPE THE CHARGE OF CONFISCATION.

This court does not sit to hear or determine moot questions. Whenever it appears that a judgment or decree must in any event be affirmed, the court goes no further, and will not investigate or decide other issues, either of law or of fact

As was said in Glasgow vs. Baker, 128 U. S., 560, 577:

> "Other questions have been argued by counsel in this case, and we have been urged in the brief to decide them; but as this proposition is a broad one, which covers the whole case, and is sufficient to dispose of it, we pursue our uniform course of declining to consider other matters not necessary to a determination of the issue."

See also:

Brobst vs. Brock, 10 Wall., 519, 528.

Lancaster vs. Collins, 115 U. S., 222, 227.
Meeker vs. Lehigh Valley R. R. Co., 236 U. S., 434, 439.

The sole question before this court is whether the decree of the court below, which declared the ordinance invalid and enjoined its enforcement, should be affirmed or reversed. In the court below the validity of the ordinance was assailed upon two grounds. The first of these we have hereinbefore discussed (*supra*, pp 56 *et seq.*). We submit that upon this ground alone the decree was right, and should be affirmed; if so, all questions relating to the issue of confiscation, which was the second ground upon which the ordinance was attacked, are moot. But even if this were not so, and the ordinance had been attacked solely upon the charge that the rates were confiscatory, it is manifest, from what has already been said, that, upon the issue of confiscation, all questions relating to valuation have become moot. This is so because the amount of the net earnings or return possible under the ordinance rates has been conclusively determined and is not open to any question. It is therefore a fixed factor.

Appellants' contentions respecting valuation are that certain items included therein ought to be eliminated or reduced in amount. We do not, of course, concede any of these contentions. On the contrary, all of them are vigorously contested, as is evident from the succeeding pages. But we now submit that it is wholly unnecessary for the court to enter upon the burdensome and necessarily laborious task of considering those contentions, and our answers thereto.

The issue of confiscation has now come merely to a matter of arithmetic. Even though we should take as the rating base the lowest valuation, which by any possibility could result from appellants' contentions, and apply thereto the net earnings under the ordinance rates (now a fixed and known quantity), a simple computation would demonstrate that the resultant rate of annual return is far below that which this court has repeatedly held necessary to escape the charge of confiscation.

1. *Computations Showing the Rate of Annual Return upon Various Valuations Contended for by Appellants.*

As a preliminary to this discussion, we desire to point out that, tested by the findings of the Master concerning operating expenses, taxes and depreciation allowance, even the going rates now and for many years assessed by the Water Company produce a net return which is certainly inadequate.

According to the report of Mr. Mitchell, the defendants' expert accountant, the gross income under said going rates for the fiscal year ending October 31, 1914, was $1,323,368.65 (Record, p. 1109, Exhibit D).

According to the Master's findings, operating expenses, taxes and depreciation allowance aggregate $604,795 (Record, p. 139). The resultant net earning or return is $718,573.65, which, measured by the valuation found by the Master ($13,415,899), is equivalent to .052 as the rate of annual return. We submit that this is far less than this utility ought to be permitted to earn, and is certainly far less than

similar utilities in other cities of like population do earn. It demonstrates beyond question that the going rates, in which the ordinance attempted to make a reduction of more than twenty per cent., are, to say the least, not excessive.

Appellants' contentions relative to the Master's valuation are these, and only these:

First: That water rights to the value of "$1,998,117 should not be included in determining the value of the company's property" (appellants' brief, p. 30).

Second: That going value, fixed by the Master at $800,000, should be eliminated, because whatever of such value existed had already been included in other portions of the Master's valuation, particularly in his allowance of overhead charges and interest during construction (appellants' brief, pp. 63 to 78). Appellants are limited to this contention by their exception (Record, p. 1136, Exception 17th), and by their assignments of error (Record, p. 1154, Assignment XVIII).

Third: That as to overhead charges and interest during construction, which were allowed by the Master in determining reproduction cost, these should be reduced by the amount allowed for going value, as aforesaid, in the event, and only in the event, that the allowance of going value as made by the Master is permitted to stand; this upon the theory that in making the above allowances the Master has permitted a duplication of values (appellants' brief, pp. 79 to 82). Appellants' contention in this regard is clearly limited, as aforesaid, by their exceptions (Record, p. 1135, Exception 16th; p. 1136, Exception 18th), and

by their assignments of error (Record, p. 1153, Assignment XVII; p. 1154, Assignment XIX).

Upon the whole valuation as found by the Master, the rate of net annual return, as also found by him, was .0364 (Record, p. 139, Finding 51). To what extent would this be increased if the deductions from the Master's valuation sought by appellants were made? The following computations answer that question:

(a) If from the Master's valuation ($13,415,899) we should deduct all of the items of property and elements of value, concerning which appellants have raised any question whatsoever, to-wit, water rights, $1,998,117; going value, $800,000; engineering and contingencies, $912,916 (the net amount allowed); interest during construction, $699,545, the resultant rating base would be $9,005,321. Measured by this rating base, the rate of net annual return would be .054. But the deductions made in the foregoing computation carry us far beyond any contention which appellants are at liberty to make, and, indeed, far beyond any contention which they actually do make.

(b) If from the Master's valuation ($13,415,899) we deduct water rights, as claimed by appellants ($1,998,117), and going value ($800,000), the resultant rating base is $10,617,782. Measured by this rating base, the rate of net annual return would be .046. In the foregoing computation appellants' contentions have really been carried to their extreme limit. Since going value has therein been entirely excluded, it follows that interest during construction, and engineering and contingencies must be included, because the alleged duplication of values has been entirely avoided.

(c) If from the Master's valuation ($13,415,899) we deduct water rights only, according to the claim of appellants ($1,998,117), the resultant rating base is $11,417,782. Measured by this rating base, the rate of net annual return would be .042.

(d) If from the Master's valuation ($13,415,-899) we deduct going value ($800,000), the resultant rating base is $12,615,899. Measured by this rating base, the rate of net annual return is .038.

Each of the foregoing computations is based, as it must be, upon the amount of net earnings ($488,820), found by the Master.

These computations demonstrate to a mathematical certainty that the rates prescribed by the ordinance in question are, in any event, confiscatory. No contention is made, or can be made, in this court by appellants which requires the assumptions upon which the first computation, (a), *supra*, is based. Those assumptions go far beyond anything that could possibly be done in the way of reduction of the valuation. Yet, even upon such assumptions, the rate of net annual return is conclusively shown to be less than five and one-half per cent. Obviously, no such result is possible here.

The actual limit to which appellants can by any possibility go, even in asserting their contentions, is measured by the assumptions upon which the second computation, (b), *supra*, is based, and upon those assumptions the rate of net annual return is conclusively shown to be .046. That is the best result for which appellants upon this record are at liberty to or do contend for. If they succeeded beyond their fondest hopes they would show a net return of only .046.

If they failed in any of their contentions respecting value, the rate of net return would, of course, be less than this, gradually diminishing as the extent of their failure increased, until it again coincided with the finding of the Master (.0364), if, as we confidently expect, all of their contentions respecting value should be rejected.

We submit respectfully, but with confidence, that each of these rates of annual net return is so far below that which will escape the charge of confiscation as to render it absolutely certain that the ordinance rates are confiscatory, without further consideration of any question relating to values.

But there is another method of computation, by which the same conclusion is made inevitable. The net earnings as found by the Master, and now conclusively established, are $488,820. The capitalization of this sum at any rate of net annual return at all within reason, gives interesting results.

1. Capitalized at eight per cent., the net earnings produce a capital sum of $6,110,250. The difference between this capital sum and the Master's valuation ($13,415,899) is $7,305,649. If the Master's valuation be correct, and eight per cent. per annum the requisite rate of return, it follows that under the ordinance the use of property having a value of more than $7,300,000 is taken without just or any compensation.

By similar computations, and with the same assumption as to the rate of return, if deductions from the Master's valuation are made as assumed in computation (a), *supra*, the property value taken without compensation would be $2,895,071; or if deductions be made as assumed in computation (b), *supra*, $4,507,-

532; or if deductions be made as assumed in computation (c), *supra*, $5,307,532; of if deductions be made as assumed in computation (d), *supra*, $6,505,649.

2. The net earnings aforesaid, capitalized at seven per cent., produce a capital sum of $6,983,143. This means, if the Master's valuation is correct, and seven per cent. per annum is an adequate rate of return (which, under the conditions here, it certainly is not), that property to the value of $6,432,756 is taken for public use without just or any compensation.

Upon the same assumption as to rate of return (which appellee earnestly contends is unduly low), and making the deductions from the Master's valuation assumed in the various computations, *supra*, the results are as follows:

Making the deductions assumed in computation (a), *supra*, it results that property of the value of $2,022,178 is taken without just or any compensation; or making the deductions assumed in computation (b), *supra*, property of the value of $3,634,639 is so taken; or making the deductions assumed in computation (c), *supra*, property of the value of $4,434,639 is so taken; or making the deductions assumed in computation (d), *supra*, property of the value of $5,632,756 is so taken.

3. The net earnings aforesaid, capitalized at six per cent., result in a capital sum of $8,147,000. Six per cent. is an unduly low rate of return. Under the circumstances presented by this record, it is, we submit, certainly confiscatory. It is used here merely by way of illustration. Even at that rate of return, and assuming that the Master's valuation is correct, prop-

erty having a valuation of at least $5,268,899 would be taken without just or any compensation.

Using the same rate of return (six per cent.), and making the deductions from the Master's valuation assumed in the several computations hereinabove set forth, the results are as follows:

Making the deductions assumed in computation (a), *supra*, property of the value of $858,321 would be taken without just or any compensation. Making the deductions assumed in computation (b), *supra*, property of the value of $2,470,782 would be so taken. Making the deductions assumed in computation (c), *supra*, property of the value of $3,270,782 would be so taken. Making the deductions assumed in computation (d), *supra*, property of the value of $4,468,899 would be so taken.

The foregoing computations demonstrate clearly the unconstitutionality of the ordinance, without further consideration of appellants' contentions relative to the Master's valuation. It is not open to question that appellee is entitled to a fair net return upon each dollar's worth of property, the use of which is taken by the public. But it is clear to a mathematical certainty that appellants might succeed in all of their contentions respecting valuation to the uttermost limit, and beyond, and yet property of appellee to the value of millions of dollars would have been taken for the use of the public without just or any compensation. It follows inevitably that all of appellants' contentions respecting the Master's valuation are merely moot and need not and should not be considered.

2. *Computations in Appellants' Brief, Pages 109 to 111, Erroneous and Misleading.*

Appellants' computations referred to above are intended to indicate the result on the rate of annual net return, if appellants' contentions respecting valuation, or some of them, should be upheld. They are erroneous and misleading, because based upon false assumptions, both as to valuation and the result of appellants' contentions thereon, and also as to net earnings.

The table on page 109 of appellants' brief is as to valuation or rating base, compiled upon the assumption that from the Master's valuation there be deducted not only water rights and going concern, according to appellants' contention, but also the Master's allowances for engineering and contingencies and interest during construction. The two items last mentioned are usually referred to as overhead costs.

As we have already demonstrated, appellants' contentions respecting overhead costs and going value are inseparably connected. Those contentions go to the extent, and only to the extent, of claiming that by the allowance both of going value and of overhead costs the Master has permitted a duplication of values, in that the overhead costs necessarily include and cover the going value. Considering the nature and limit of these contentions, obviously, they amount to this: that if going value be allowed, the Master's allowance for overhead costs should be diminished by the amount allowed for going value; but that if the allowance for going value be eliminated, the Master's

allowance for overhead costs must stand undiminished (see *supra*, pp 161, 162).

But beyond this, the table on page 109 of appellants' brief is further erroneous, in respect to the assumptions concerning valuation or rating base, in that the deductions made on account of what is claimed to have been allowed by the Master for "Eng. and Cont." (overhead costs) is stated as $1,046,272, when in fact it should be only $912,916. This is readily demonstrable. The Master's allowance for engineering and contingencies was twelve and one-half per cent. of the gross reproduction cost of structures (Record, p. 122, Table 1, Column 2; also Record, p. 136, Finding 44). It was not in his report set forth as a separate figure, but was included in said gross reproduction cost. Thereafter it, like the rest of the gross reproduction cost, was depreciated (Record, p. 122, Column 3), and the result given as the present reasonable value, from which the Master's total valuation or rating base was determined. According to the Master's report (Record, p. 122, Column 4), the depreciated reproduction cost or present reasonable value of the structures (Classes C to S) is $8,216,237. But this represents net reproduction cost, including 12½ per cent. for overhead costs, and is therefore 112½ per cent. of net reproduction cost, without overhead. From these factors a simple mathematical computation demonstrates that the amount of overhead costs (Eng. and Cont.) included in the Master's present reasonable value of structures is $912,916 instead of $1,046,272, as given in the table on page 109 of appellants' brief.

But in said table on page 109 the amount deducted from the Master's valuation, on account of in-

terest during construction, is $805,000, which is the Master's determination of the gross amount of interest during construction, without deduction for depreciation. But from this sum the Master deducted depreciation to the amount of $105,455, and the amount included in his valuation on account of interest during construction was only the sum of $699,545 (Record, p. 122, Table 1, Columns 1, 3 and 4).

Correcting these obvious mistakes in the table on page 109 of appellants' brief, in respect to the deductions there made from the Master's valuation, and ignoring the manifest error in deducting not only going value, but also overhead costs (including interest during construction), the resultant rating base is $9,005,321 instead of $8,766,510, as given in the table.

Turning now to the opposite column of said table, wherein the net earnings are set down, we find that appellants have added to the net earnings as determined by the Master ($488,820) the arbitrary sum of $40,000. They have done the same thing in the tables which follow, on pages 110 and 111 of their brief. This arbitrary addition is made upon the erroneous assumption that the business done, the consequent gross earnings, and the resultant net earnings in the years 1912 and 1913 were to that extent greater than in the year 1914.

As we have already shown, this is entirely untrue, as the record conclusively demonstrates (*supra*, pp. 133, 134).

The business done and the consequent gross earnings and resultant net earnings in the year 1914 were greater than in the year 1913, and substantially

the same as in 1912. Beyond doubt, therefore, the net earnings appearing in said table on page 109, and in those which follow, should be $488,820, instead of $528,820. Measuring these net earnings by the rating base corrected as above ($9,005,321), the resultant rate of net annual return is .054 instead of .06+, as given by appellants. The basic figures and the result are the same as in our computation (a), *supra*, page 162.

But as we have already said, the table just commented upon illustrates a situation which cannot possibly occur as the result of any contention, or series of contentions, which the appellants can, or in reality do, make.

Turning now to the table on page 110 of appellants' brief, we find the same arbitrary addition of $40,000 to the net earnings. This is wrong, as we have already shown. Eliminating, as we must, this erroneous addition to net earnings, appellants' table on page 110 of their brief is precisely the same as one of the computations which we have already made (Computation (b), *supra*, p. 162), and the resultant rate of return is .046 instead of .0497, as stated in appellants' table.

Coming now to the table on page 111 of appellants' brief, we find the same obvious and unmistakable error in adding the arbitrary sum of $40,000 to the net earnings. Eliminating this, as we must, the table on page 111 of appellants' brief is exactly the same as one of the computations hereinbefore made by us (Computation (c), *supra*, p. 163, and the resultant rate of return is .042 instead of .046 as given in appellants' table.

It follows that if all of appellants' contentions were conceded to their farthest possible limit (and, of course, none of them is conceded at all), the utmost that could under any circumstances be expected by way of net annual return is .046. This appellants' own tabulations, rightly considered, demonstrate.

3. *Eight Per Cent. per Annum Is the Least Rate of Return Which under the Circumstances Here Presented Can Escape the Charge of Confiscation.*

The Master's finding upon the subject of fair return is as follows (Record, p. 140):

> "The Water Company is entitled to a fair return upon the reasonable value of the property used by it for the convenience of the public unless, considering the nature of the service rendered by it, such a return is not fair and just to the public.
>
> The rule in this regard is stated in the case of Willcox v. Consolidated Gas Co., 212 U. S. 19 at 48 as follows:
>
> 'There is no particular rate of compensation which must, in all cases and in all parts of the country, be regarded as sufficient for capital invested in business enterprises. Such compensation must depend greatly upon circumstances and locality; amoung other things, the amount of risk in the business is a most important factor, as well as where the business is conducted, and the rate expected and usually realized there upon investments of a somewhat similar nature with regard to the risk attending them.'

The evidence shows that the going rate of interest for loans on business and residence properties in Denver is about six (6) per cent. and on ranch property near Denver about seven (7) per cent. The interest rate provided by the Colorado statute is eight (8) per cent. The current bank rate on good risks is about six and one-half (6½) per cent. According to Exhibit A-59, the average rate of interest paid by the Company for money received for sale of its bonds between 1901 and 1913, was over six per cent., although nominally five per cent.

I find that 3.64 per cent. is not a fair or just return for the use of the property of the Water Company by the public.

The evidence shows the service of the Water Company is of such value as to render fair to the public, rates which are sufficient to yield a fair return on the reasonable value of the property devoted to the use of the public."

The Master expressly finds that 3.64 per cent. is not a fair or just rate of net return, but does not expressly find what is the least rate of net return which would escape the charge of confiscation. He does, however, what amounts to the same thing, by finding expressly that the prevailing interest rates on well-secured real estate loans are six and seven per cent., and the current bank rate on good risks about six and one-half per cent. It is plain that the Master did not regard such investments as being "of a somewhat similar nature with regard to the risk attending

them" as a private investment in the Denver water-works. Clearly, an investment in the Denver water-works, particularly in view of what has occurred and is occurring there respecting municipal competition, and like matters, is in point of safety not to be compared with loans on business and residence properties in Denver, or on ranch property near Denver, or with bank loans on good risks. Certain it is that the private investment in the water-works must command and, as against public regulation, is entitled to have, a rate substantially greater than six or six and one-half or seven per cent., and certainly not less than eight per cent. per annum.

The Master also finds that the money borrowed by the Company on its long-term bonds has cost it over six per cent. per annum. It is plain that a utility is, as against public regulation, entitled to earn a substantial margin over the actual hire of money which it is required to pay to obtain the funds with which to construct its works. If the capital of the utility costs it as much as said capital can be made to earn in the business of the utility, there is obviously no profit whatever in the business, but only a repayment of what it actually costs to carry it on.

This was clearly demonstrated by the witnesses both for plaintiff and defendants. (Record, pp. 236, 438.)

The Master refers to the Colorado Statute (Revised Stats. 1908, p. 859, Sec. 1361), which provides an interest rate of eight per cent. per annum, applicable where there is no different agreement between the parties. This reference clearly indicates that in the Master's judgment the rate of net return to this util-

ity must, to escape the charge of confiscation, be at least as much as the statutory rate.

Appellants' contention upon this subject is thus stated in their brief (p. 107):

> "In determining the fair rate of return for an investment as large as this,the evidence of what banks charge for short-time loans of three months, or as to what rate of interest is charged for small real estate loans, is not persuasive. The larger the amount of the investment the smaller the return expected, and even the rate of .0364, as found by the master, when the amount involved is taken into consideration, *and the further fact that there is almost no hazard to be taken,* is so close at least to a fair return that it should not be disturbed." (Italics ours.)

The rate of net return as found by the Master is substantially less than that at which the recent enormous bond issue of the United States—the largest in the history of the nation—was marketed. The subscribers thereto were largely actuated by patriotic motives. The bonds themselves and the income therefrom were tax free, rendering the actual net return substantially 3.9 per cent. per annum. The element of hazard was nil. The purchasers were promised the benefit of any increase in interest rate which might attach to subsequent issues. Is it possible that an investment in the Denver water-works can fairly be said to stand upon the same basis as one in such a Government bond issue? Can it be that one who has invested his money in the Denver water-works

is, as against public regulation, entitled to no greater rate of return than one who has invested his money in Liberty Bonds? Does the investor in the Denver water-works take no greater risk than the purchaser of Liberty Bonds? These questions answer themselves. Appellants' contentions which are quoted above, are outrageously absurd.

The leading and conclusive authority (quoted and relied upon by the Master) is Willcox vs. Consolidated Gas Co., 212 U. S., 19. There the subject is thoroughly discussed in every aspect. Following that portion of the opinion quoted in the Master's finding, and set forth above, the court said (p. 48):

> "There may be other matters which in some cases might also be properly taken into account in determining the rate which an investor might properly expect or hope to receive and which he would be entitled to without legislative interference. The less risk, the less right to any unusual returns upon the investments. One who invests his money in a business of a somewhat hazardous character is very properly held to have the right to a larger return without legislative interference, than can be obtained from an investment in Government bonds or other perfectly safe security. The man that invested in gas stock in 1823 had a right to look for and obtain, if possible, a much greater rate upon his investment than he who invested in such property in the city of New York years after the risk and danger involved had been almost entirely eliminated.

In an investment in a gas company, such as complainant's, the risk is reduced almost to a minimum. It is a corporation, which in fact, as the court below remarks, monopolizes the gas service of the largest city in America, and is secure against competition under the circumstances in which it is placed, because it is a proposition almost unthinkable that the city of New York would, for purposes of making competition, permit the streets of the city to be again torn up in order to allow the mains of another company to be laid all through them to supply gas which the present company can adequately supply. And, so far as it is given us to look into the future, it seems as certain as anything of such a nature can be, that the demand for gas will increase, and, at the reduced price, increase to a considerable extent. An interest in such a business is as near a safe and secure investment as can be imagined with regard to any private manufacturing business, although it is recognized at the same time that there is a possible element of risk, even in such a business. The court below regarded it as the most favorably situated gas business in America, and added that all gas business is inherently subject to many of the vicissitudes of manufacturing. Under the circumstances, the court held that a rate which would permit a return of six per cent would be enough to avoid the charge of confiscation, and for the reason that a return of such an amount was the return ordi-

narily sought and obtained on investments of that degree of safety in the city of New York.

Taking all facts into consideration, we concur with the court below on this question, and think complainant is entitled to six per cent on the fair value of its property devoted to the public use."

Six per cent. per annum is therefore the basic figure below which it is impossible to go. But applying the principles clearly enunciated by this court to the situation in Denver, in respect to the investment in the Denver water-works, it does not admit of doubt that a net return of six per cent. per annum is far too low to escape the charge of confiscation. If six per cent. per annum is, as plainly held by this court, the least amount to which such a utility as The Consolidated Gas Company is entitled in the City of New York, what must be the least rate for such a utility as the Water Company in such a community as Denver?

In the case of The Consolidated Gas Company one of the points chiefly emphasized by this court was the fact that risk was reduced almost to a minimum, because the utility had what was practically a perpetual monopoly of a public necessity in the largest city in America. Special emphasis was laid upon the complete absence of the possibility of municipal or other competition. But in the case of The Denver Union Water Company, not only is its investment subject to the usual risks ordinarily incident to the public utility business in a western city, but, in addition, it has always been, and is now, subject to the risk of municipal competition, which is a real and most seri-

ous menace. As is obvious, and is clearly demonstrated by the evidence in this case, municipal competition would result in the practical destruction of the Water Company's entire investment (Record, pp. 200, 205, 207, 231, 235, 283, 284, 295, 901). And yet, as is evident from the "Historical Review" with which this brief is introduced (*supra*, pp. 5 *et seq.*), this menace, as well as other conditions greatly affecting the risk involved, has been constantly present. Bonds with which to construct a competing municipal plant have been twice voted, once in 1900 and again in 1910. Moreover, in the latter year, Section 264-A of the charter was adopted, which offered the Company the choice between taking $7,000,000 for its plant or being forced out of business by the municipal plant, which, if the Company refused said offer, was required to be built. Concerning these matters the court already has some knowledge.

City and County of Denver vs. New York Trust Co., 229 U. S., 123.

In 1914, when the rate ordinance was enacted, the situation in this regard was, and thereafter continued to be, particularly acute, and the menace to the investment especially serious. This situation has not yet been relieved, nor the menace removed.

Wheeler vs. City and County of Denver, 231 Fed., 8.

We submit with respectful confidence that the decision of this court in the Consolidated Gas case is ample and conclusive authority to sustain our claim that under the circumstances presented by this record

eight per cent. per annum is the least rate of return which can escape the charge of confiscation.

In Shepard vs. Northern Pacific Ry. Co. (Minnesota Rate Cases), 184 Fed., 765, Judge Sanborn in the lower court considered the matter fully, referred to the fact that the legal rate of interest on a debt in Minnesota, in the absence of contract, is six per cent. (in Colorado eight per cent.), pointed out the risks to which investments in railroads are in Minnesota subjected (which are clearly not so serious as those prevailing here), and concluded as follows (p. 816):

> "It is an axiom in economics that the greater the risk the greater must the return be upon invested capital, and the conclusion is irresistible that a net return of seven per cent. per annum upon the respective values of the properties of these Companies in Minnesota devoted to transportation is not more than the fair return to which they are entitled under the Constitution of the United States."

When the Minnesota Rate Cases came to this court the decrees in some of them were reversed, though that in one was affirmed, but these reversals occurred because of errors in the determination and apportionment of values and expenses. The conclusion of the court below upon the subject of the requisite rate of return was not criticized, and evidently met with this court's approval.

Minnesota Rate Cases, 230 U. S., 352.

In the Arkansas Rate Cases, 187 Fed., 290, the question was fully discussed (pp. 344 to 348), and the conclusion reached that the least rate of return upon a railroad investment in Arkansas, which, under public regulation, could escape condemnation as confiscatory, would be seven and one-half per cent. per annum.

When the Arkansas cases came to this court, the decrees were reversed for the same reason as in the Minnesota Rate Cases; but the conclusion of the court below concerning the requisite rate of return was not criticized, and evidently met with the approval of this court.

Allen vs. St. Louis etc. Ry. Co., 230 U. S., 553.

In Boyle vs. St. Louis & S. F. R. Co., 222 Fed., 539, which involved the same rates as those considered in the previous Arkansas Rate Cases, the lower court (558) again decided that the requisite rate of net return was seven and one-half per cent. per annum.

In Rowland vs. Boyle, 244 U. S., 106, the case last cited was on appeal considered by this court and the decree of the court below, which had held the rates confiscatory, was in all respects affirmed. The conclusion is inevitable that this court agreed with what had been decided in the lower court concerning the requisite rate of return.

The Public Utilities Commission of Colorado, which since 1914 has, under the direct authority of a state statute, exercised the power to regulate the rates of utilities, has uniformly held that the rate of annual

net return, after liberal allowances for operating expenses, taxes and depreciation, should be fully eight per cent., and has consistently refused to reduce rates of public utilities in Colorado below a point where they would yield at least that much.

In re Rates and Service of The Colorado Springs Light, Heat & Power Co., Vol. 1, Decisions of the Public Utilities Commission of Colorado, p. 159, was decided in December, 1915. The Commission held (p. 168) that before coming to the question of net return at all the utility was entitled, in addition to operating expenses and taxes, to depreciation allowances, as follows: 4.25 per cent. on the *cost new* of its depreciable electric property, 2.8 per cent. on the *cost new* of its depreciable hydro property, and 3 per cent. on the *cost new* of its depreciable gas property.

In the case at bar the Master's allowance for depreciation ($140,000) is approximately one per cent. upon his present valuation of the entire plant ($13,415,899), less than one per cent. upon his gross valuation thereof, without deduction of depreciation ($14,736,869), and 1.3 per cent. upon the cost new of the depreciable property only ($10,221,438).

After making these allowances, the Colorado Commission in the case above cited (p. 180) refused to reduce the rates for electric service below a point where they would "yield a return in excess of seven and one-half per cent. per annum upon the present value of the electric and hydro properties of the defendant corporation," and suggested (p. 192) an increase in the gas rates.

In re Mountain States Telephone & Telegraph Co., Vol. 3, Decisions of the Public Utilities Commission of Colorado, p. 122, decided January 5, 1917, is an elaborate opinion by the Commission, setting forth its conclusions concerning the valuation and the earnings of the company named above, which is the utility corporation furnishing the telephone service of Denver and of the State of Colorado. After determining the present fair value of the property ($14,698,414), and after making very liberal allowances for operating expenses and taxes, the Commission determined (p. 285) that as a depreciation allowance the company "should be allowed to set aside annually an amount equal to approximately 5.65 per cent. of its investment in depreciable property" (in the case at bar this allowance was 1.3 per cent.); and that in addition to the operating expenses, taxes and the depreciation allowance mentioned above, the company should be permitted to make net earnings equivalent (p. 291) to eight per cent. per annum.

It is important to observe that the utility involved in the case last cited serves the same community which is served by the appellee in this case. But neither of the utilities considered by the Colorado Commission in its two decisions cited above was subject to any such risks as those which beset The Denver Union Water Company.

The decision of this court in the Consolidated Gas case (212 U. S., 19) was announced in January, 1909. It is significant that since that decision the rate of net return which marks the line separating confiscatory regulation from that which is not confiscatory, has been, by the courts, constantly raised.

In Whitten on Valuation of Public Service Corporations (Vol. 1, Secs. 731 to 785; Vol. 2, Secs. 1433 to 1445), the decisions upon this question, arranged chronologically, to and including 1914, are reviewed and quoted from. From these it is evident that the requisite rate of net return has been constantly increased, particularly since 1909, and in the western states the rate usually now required is eight per cent. per annum. A few of the recent decisions, with their respective dates, and the rate of return required in each, are given below:

1907, Cumberland Tel. & Tel. Co. vs. R. R. Commission, 156 Fed., 823, 833, seven per cent.

1908, Pennsylvania R. R. Co. vs. Philadelphia County, 220 Pa. Sta., 100; 68 Atl., 676, 679, legal rate of interest, six per cent. the minimum.

1908, Central of Georgia Ry. Co. vs. R. R. Commission, 161 Fed., 925, 993, 995, 996, eight per cent.

1909, Lincoln Gas & Electric Light Co. vs. City of Lincoln, 182 Fed., 926, 929 (223 U. S., 349), six per cent. the minimum.

1909, C. H. Venner Co. vs. Urbana Water Works, 174 Fed., 348, 352, six per cent. the minimum.

1909, City of Owensboro vs. Cumberland Tel. & Tel. Co., 174 Fed., 739, 742, six per cent. the minimum.

1911, Shepard vs. Northern Pacific Ry. Co., 184 Fed., 765, 815, seven per cent. the minimum.

1911, Cumberland Tel. & Tel. Co. vs. City of Louisville, 187 Fed., 637, 658, seven per cent. the minimum.

1911, In re Arkansas Rate Cases, 187 Fed., 290, 346, 347, seven and one-half per cent.

1911, Des Moines Water Co. vs. City of Des Moines, 192 Fed., 193, 198, eight per cent.

1912, Louisville & Nashville R. R. Co. vs. R. R. Commission of Alabama, 196 Fed., 800, eight per cent.

1912, Western of Alabama Ry. vs. R. R. Commission of Alabama, 197 Fed., 954, 959, eight per cent.

In the case at bar it is perfectly obvious that having regard to the risk attendant upon the investment, eight per cent. per annum is the least rate of net return which will enable the rates to escape condemnation as confiscatory.

It follows inevitably that the rates prescribed by the Denver ordinance here in question are beyond doubt confiscatory, no matter what view might be taken of appellants' contentions concerning valuation.

The conclusion is unavoidable that the decree of the court below must be, in any event, affirmed.

We therefore submit that all questions arising upon appellants' contentions concerning valuation are merely moot, and need not and should not be considered.

V.

VALUATION. GENERAL PRINCIPLES APPLICABLE. HOW THE MASTER'S VALUATION WAS DETERMINED. APPELLANTS' CRITICISMS ANSWERED.

1. *To Escape the Charge of Confiscation, the Valuation or Rating Base Must Represent the Present Fair Value of All of the Property Owned by Appellee and Devoted to the Public Use. The Constitution Is Violated if Any Item of Property or Any Element of Value Included or Inherent in the Plant Be Omitted.*

We have already called attention (*supra*, pp. 95 *et seq.*) to the constitutional principles governing such a case as this, and to the established doctrine that they have like application both to rating and to condemnation cases.

To determine whether the reward which the state allows for the use of private property by the public constitutes just compensation for the taking, renders it necessary to determine (1) the value of the property so required to be devoted to the public use, (2) the rate of return upon such value to which the owner is justly entitled as compensation for its use by the public, (3) the net earnings and consequent rate of return possible under the prescribed rates. It follows that whether the taking by public authority

consists in the actual seizure of the corpus of the property, or whether it consists in a taking of the use, leaving the possession and title in the owner, it is nevertheless necessary at the outset of the judicial inquiry to determine the value of the property itself. In cases of condemnation or seizure the value so ascertained is the purchase price which the public must pay. In rating cases the value so ascertained is the basis with respect to which must be determined the justness of the return afforded by the regulated rates. But in either case the value of the property is the basic fact to be ascertained, and its determination is controlled by the same principles, for it is that property and its value which lie within the protection of the constitutional provisions to which we have referred.

Early in the history of rate litigation this court laid down the fundamental principle, to which it has since steadily adhered, that the present fair value of the private property used or useful in affording the public service is the measure of the reward to which the owner of that property is entitled for the service rendered, just as it is the measure of the price which the owner is entitled to receive if the corpus of the property itself be seized and taken for the public benefit. That the valuation thus to be determined in a rating case is the same as that to be determined in a condemnation proceeding has been repeatedly held.

Some of the cases so holding are listed below:

Reagan vs. Farmers Loan & Trust Co., 154 U. S., 362, 410.

Ames vs. Union Pacific, 64 Fed., 165, 177.

Smyth vs. Ames, 169 U. S., 466, 546.

San Diego Land & Town Co. vs. National City, 174 U. S., 739, 757.

Chicago, Milwaukee & St. Paul Ry. Co. vs. Tompkins, 176 U. S., 167, 173.

San Diego Land & Town Co. vs. Jasper, 189 U. S., 439, 442.

The Consolidated Gas Co. vs. Mayer, 146 Fed., 150.

The Consolidated Gas Co. vs. City of New York, 157 Fed., 849.

Wilcox vs. The Consolidated Gas Co., 212 U. S., 19.

Lincoln Gas & Electric Co. vs. Lincoln, 223 U. S., 349, 357.

Cumberland Telephone & Telegraph Co. vs. City of Louisville, 187 Fed., 637, 641.

Louisville vs. Cumberland Telephone & Telegraph Co., 225 U. S., 430.

Shepard vs. Northern Pacific (Minnesota Rate Cases), 184 Fed., 765, 802, 803.

The Minnesota Rate Cases, 230 U. S., 352, 434, 454.

San Joaquin etc. Irrigation Co. vs. Stanislaus County, 191 Fed., 875, 895.

San Joaquin etc. Irrigation Co. vs. Stanislaus County, 233 U. S., 454, 459 (reversing the above).

Cotting vs. Kansas City Stock Yards Co., 82 Fed., 850, 853.

Missouri K. & T. Ry. Co. vs. Love, 177 Fed., 493, 494-496.

Love vs. A. T. & S. F. Ry. Co. (C. C. A., 8th Cir.), 185 Fed., 321, 326, 327.

Re Arkansas Railroad Rates, 163 Fed., 141 (opinion by Mr. Justice Van Devanter).

Des Moines Water Co. vs. City of Des Moines, 192 Fed., 193, 197.

Chicago & N. W. Ry. Co. vs. Smith, 210 Fed., 632.

Louisville & Nashville Ry. Co. vs. Railroad Commission, 196 Fed., 800, 818, 820, 821.

Spring Valley Water Works Co. vs. San Francisco, 124 Fed., 574, 590, 594, 595.

Spring Valley Water Co. vs. San Francisco, 165 Fed., 657, 680.

Spring Valley Water Co. vs. San Francisco, 192 Fed., 137, 144, 145.

Bonbright vs. Geary, 210 Fed., 44, 48.

We apologize for citing so many cases upon a point which is now so well settled. They are here listed chronologically and merely as a matter of convenience in case the court should wish to trace the development of the doctrine. These cases hold that the valuation to be ascertained is the same, and the principles upon which it is determined identical, whether the purpose be rating or condemnation; that in either event present fair value, not original cost,

is the determining factor, and that in either event the constitution is violated if any item of property or any element of value be omitted. It makes no difference how the property was acquired or what it cost, or whether it cost anything at all. The sole questions are, Is it owned and taken or used, and, if so, what is its present fair value?

In Ames vs. Union Pacific, 64 Fed., 165, there was involved the right of way of the Union Pacific Railroad Company, which, as is well known, had been granted by the Act of Congress known as the Pacific Railroad Act. The contention was made that, therefore, it should not be included in the valuation, but Mr. Justice Brewer said (64 Fed., 176): "No inquiry is open as to whether the owner has received gifts from state or individuals, or whether he has as owner managed the property well or ill, or so as to acquire a large fortune therefrom. It is enough that he owns the property—has the legal title; and so owning, he must be paid the actual value of that property." That decision was affirmed by this court (169 U. S., 466, 546).

In the Consolidated Gas case there was involved the right to lay, maintain and operate in the streets of the City of New York the necessary pipes for the distribution of gas. These rights (referred to as franchises) had been granted to the company without cost. It was contended that for that reason they should not be valued. In the lower court the contention, after full discussion, was expressly negatived, and a value assigned of $12,000,000 (157 Fed., 875 *et seq.*).

When the Consolidated Gas case reached this court, the determination that said franchises must be val-

ued and included, though they had cost nothing, was expressly affirmed. This court, however, reduced their valuation from $12,000,000, as found by the lower court, to $7,781,000, a sum which had at one time been agreed to by the companies. Upon this subject the language of the court was in part as follows (212 U. S., 43):

> "They each had the right to use the streets of certain portions of the city for the purpose of laying their mains and service pipes in order to furnish gas to the city and the citizens. Not one of the companies had ever been called upon to pay a penny for such right, but the grant to each was in that aspect a gratuity. It was not at the time of granting franchises such as these the custom to pay for them. * * * (p. 44). It cannot be disputed that franchises of this nature are property and cannot be taken or used by others without compensation. Monongahela vs. United States, 148 U. S. 312; People vs. O'Brien, 111 N. Y. 1, and cases cited. The important question is always one of value, * * * (p. 52) and we concur with the court below in holding that the value of the property is to be determined as of the time when the inquiry is made regarding the rates. If the property which legally enters into the consideration of the question of rates has increased in value since it was acquired, the company is entitled to the benefit of such increase."

In the Minnesota Rate Cases there was involved the right of way of the Northern Pacific which had been granted by Act of Congress without cost to the company. There were also involved the rights of way of other railroads which had been likewise acquired without cost under the General Right of Way Act of 1875. It was contended in those cases that, therefore, these rights of way ought not to be included in the valuation. Said contention was clearly negatived both in the lower court and in this court. In the lower court (184 Fed., 803) Judge Sanborn said: "A large part of the right of way of the Northern Pacific Company was granted to it by the nation." Nevertheless, its present fair value was ascertained and included in the valuation. When the cases reached this court, said determination was expressly affirmed, this court saying (230 U. S., 454):

> "It is clear that in ascertaining the present value we are not limited to the consideration of the amount of the actual investment. If that has been reckless or improvident, losses may be sustained which the community does not underwrite. As the company may not be protected in its actual investment if the value of its property be plainly less, so the making of a just return for the use of the property involves the recognition of its fair value if it be more than its cost. The property is held in private ownership, and *it is that property* and not the original cost of it of which the owner may not be deprived without due process of law."

In San Joaquin etc. Irrigation Co. vs. County of Stanislaus, *supra*, the lower court (195 Fed., 895) had omitted from the valuation certain water rights, upon the theory that they had been acquired by the company merely as agent for the consumer and that their acquisition had been without cost. That determination was reversed by this court, and somewhat sternly rebuked (233 U. S., 459, 460).

In the Consolidated Gas case (212 U. S., 44) this court refers to the decision in Monongahela Navigation Co. vs. United States, 148 U. S., 312, a proceeding in condemnation, as determining the principles which should govern in a rate case. In the case thus cited this court, speaking through Mr. Justice Brewer, said (p. 325):

> "But we need not have recourse to this natural equity, nor is it necessary to look through the Constitution to the affirmations lying behind it in the Declaration of Independence, for, in this Fifth Amendment, there is stated the exact limitation on the power of the government to take private property for public uses. And with respect to constitutional provisions of this nature, it was well said by Mr. Justice Bradley, speaking for the court, in Boyd v. The United States, 116 U. S. 616, 635: 'Illegitimate and unconstitutional practices get their first footing in that way, namely, by silent approaches and slight deviations from legal modes of procedure. This can only be obviated by adhering to the rule that constitutional provisions for the security of person

and property should be liberally construed. A close and literal construction deprives them of half their efficacy, and leads to gradual depreciation of the right, as if it consisted more in sound than in substance. It is the duty of courts to be watchful for the constitutional rights of the citizen, and against any stealthy encroachments thereon. Their motto should be *obsta principiis.'*

The language used in the Fifth Amendment in respect to this matter is happily chosen. The entire amendment is a series of negations, denials of right or power in the government, the last, the one in point here, being, 'Nor shall private property be taken for public use without just compensation.' The noun 'Compensation,' standing by itself, carries the idea of an equivalent. Thus we speak of damages by way of compensation, or compensatory damages, as distinguished from punitive or exemplary damages, the former being the equivalent for the injury done, and the latter imposed by way of punishment. So that if the adjective 'just' had been omitted, and the provision was simply that property should not be taken without compensation, the natural import of the language would be that the compensation should be the equivalent of the property. And this is made emphatic by the adjective 'just.' There can, in view of the combination of those two words, be no doubt that the compensation must be a full and perfect equiva-

lent for the property taken. And this just compensation, it will be noticed, is for the property, and not to the owner. Every other other clause in this Fifth Amendment is personal. 'No person shall be held to answer for a capital, or otherwise infamous crime,' etc. Instead of continuing that form of statement, and saying that no person shall be deprived of his property without just compensation, the personal element is left out, and the 'just compensation' is to be a full equivalent for the property taken. This excludes the taking into account, as an element in the compensation, any supposed benefit that the owner may receive in common with all from the public uses to which his private property is appropriated, and leaves it, to stand as a declaration, that no private property shall be appropriated to public uses unless a full and exact equivalent for it be returned to the owner."

Similar views are expressed in Boom Co. vs. Patterson, 98 U. S., 403, 405, 408, 410; and in United States vs. Chandler-Dunbar Co., 229 U. S., 53, 75, *et seq.* In the Minnesota Rate Cases, 230 U. S., 352, 451, all of the foregoing decisions were reaffirmed and their applicability to a rate case expressly adjudged.

In Bonbright vs. Geary, 210 Fed., 44, 48, the court said:

> "The inquiry will also be aided by another rule, that if the valuation of any one

of the necessary elements of the public service plant is fixed by the rate-making authorities at an amount unjustly and unreasonably low in a substantial amount, or if the value of an element of substantial value used and useful in maintaining or operating such a plant is entirely omitted by the rate-fixing authority, such unreasonable and unjust valuation or omission of valuation is the taking of private property for a public use without just compensation."

2. *How the Master's Valuation Was Determined. Nature and Scope of Appellants' Criticisms Thereof.*

The Master's valuation and the principles upon which it was ascertained are clearly set forth and fully explained in his comprehensive report (Rec., pp. 120 to 138; Findings 9 to 47, inclusive). It appears that, for convenience, the Master adopted the classification of property as set forth in the Company's inventory, which is Exhibit C. A glance at this exhibit will demonstrate the painstaking care with which it was prepared. It was introduced at an early stage of the hearing before the Master, and, although many times checked and re-checked by the witnesses for the defendants, no error in the inventory was discovered or claimed. In said Exhibit C, at pp. 62 to 64, the totals as to each general class are set forth; on pp. 65 to 97 the totals as to each subclassification under each general class are given; and at pp. 111 to 395 the property constituting each subclassification of each class is itemized with great particularity, and each item separately valued. At pp.

399 to 872 is given a precise description and enumeration of the articles entering into each item in each sub-classification under each class of said inventory. This is carried to the most minute detail, includes nothing which was not there, but omits nothing which was. (For illustration see Class T, Personal Property, Exhibit C, pp. 821 *et seq.*) The classification thus adopted by the Master was as follows: Class A, Lands (Exhibit C, pp. 111 to 115; Details, pp. 399 to 427). Class B, Water Rights (Exhibit C, pp. 117 and 118; Details, pp. 15 to 19). Classes C to S, inclusive, Structures, classified according to location (Exhibit C, pp. 119 to 390; Details, pp. 429 to 815). Class T, Personal Property (Exhibit C, pp. 391 to 395; Details, pp. 819 to 872).

As to Class A, Lands, the Master appraised them (Finding 11, Rec., p. 121) at their present market value, measured (Finding 15, Rec., p. 125) by "the present normal market value of similar lands in the same locality." The Master's valuation of lands was made in view of and in compliance with the rules recently laid down by this court in the Minnesota Rate Case, 230 U. S., 352, 449 to 456, which case was before the Master and cited by him in his report (p. 125). The total land values found by him ($637,814) appear in the table embraced in his report (Rec., p. 122), and the detail thereof in Findings 14 to 21, inclusive, of his report (Rec., pp. 124 to 127). The value claimed by the Company was $920,103 (Exhibit C, p. 64). The Master excluded from consideration a number of parcels of real estate of great value which had been included in the valuation of Metcalf & Anderson, and of the former board of appraisers—this upon the theory that said parcels were not indis-

pensably necessary elements of the plant. The Master also excluded from his valuation of lands increased values on account of special adaptability or availability for particular uses, although the former board of appraisers and Metcalf & Anderson had included such values and testified to them in this case. It is clear that, to say the least, no injustice was done to the defendants in the matter of land valuation. For obvious reasons, the Master's valuation of lands is not criticized by appellants, nor was it the subject of any exception or assignment of error by them. Appellee contends that it is unduly low.

As to Class B, Water Rights, these, like the lands, were appraised by the Master "at their present market value" (Finding 11, Rec., p. 121). The total value found by him ($2,947,617) is set forth in Table 1 of his report (Rec., p. 122), and the details thereof in his Findings 22 to 32, inclusive (Rec., pp. 127 to 132). The value claimed by the Company and testified to by its witnesses was $3,530,000 (Ex. C, p. 64). The method adopted by the Master as to Class B was to measure their value by the present market value of similar water rights in the same locality *for irrigation purposes* (Findings 25 and 26, Rec., p. 129), although the evidence showed without dispute that they were specially adapted and peculiarly available for the purpose of city supply and had a much higher value for that use. Having determined the gross value of the particular source of supply by that method, the Master deducted therefrom the value, as found by him, of the lands and waterworks structures appurtenant to such source of supply (Findings 29 to 32, Rec., pp. 131 and 132). In this also he erred in favor of the defendants, because the evidence showed, without dis-

pute, that the structures necessary for waterworks purposes such as those which he had valued were of a different character and much more costly than those required and used when the purpose was irrigation. As a result the Master's valuation of water rights was unduly low. This we shall presently undertake to demonstrate.

As to valuation, appellants do not at all question the Master's finding concerning water rights. Their sole contention in this regard is (appellants' brief, p. 30) that certain water rights valued by the Master at $1,998,117 should not have been included. This contention is hereinafter discussed.

As to Classes C to S, inclusive, covering the structures, the Master's valuation thereof ($8,216,237) appears in Column 4 of Table 1 of his report (Rec., p. 122). The value claimed by the plaintiff for these structures ($9,202,389, Exhibit C, p. 64, Col. 9) greatly exceeded the Master's finding. The principle upon which the Master's determination of the value of the structures was made is thus stated in his report (Finding 11, p. 121):

> "Estimates of the cost of reproduction of the structures are made, and from such estimated reproduction cost deductions for accrued depreciation are made, so as to determine the estimated reasonable value of the structures in their present condition. In making such estimates it is assumed that a company attempting to reproduce the structures would not do the work itself, but would cause it to be done under contract after fair competitive bidding. It is further assumed

> by the witnesses that the company reproducing the property would incur costs for engineering and superintendence, as well as other costs in addition to the fair contract cost of the structures."

The Master finds, as is the fact, that this method was "adopted by substantially all the parties on the hearing of this case." Appellants did not except, nor have they assigned any error directed to the method adopted by the Master in determining present fair value of the structures. It was the same method adopted and used by themselves in the court below.

The Master's detailed findings concerning the structures are set forth in his report in Findings 33 to 39, inclusive (Rec., pp. 132 to 135). From these it is evident that he has excluded important and costly structures, as well as large items of cost pertaining to included structures. These structures and items of cost had been included by Metcalf & Anderson, and also by the former board of appraisers.

The Master included in the gross reproduction cost the Company's overhead costs, in the nature of engineering and contingencies, in the amount of 12½ per cent. (Finding 44, Rec., p. 136.) This finding is not excepted to nor made the subject of any assignment of error by appellants, except to the extent of claiming that such an allowance of overhead costs overlaps with and constitutes a duplication of the allowance for going value. Appellants' contentions in this regard are hereinafter more fully considered.

In determining the amount of the overhead costs, the Master (Finding 42, Rec., p. 136) excluded an item of $120,000 claimed by plaintiff on account of "preliminary expenses and organization."

As an element in reproduction cost (Finding 41, Rec., p. 135) the Master determined the necessary Interest During Construction upon the sums invested, which would accrue during the period of construction and be necessarily lost to the owner of the plant, thereby unavoidably constituting a portion of the total cost. The Master determined the gross amount of Interest During Construction to be $805,000, deducted therefrom accrued depreciation, and found the net amount to be $699,545, which he included in his net reproduction cost. The net amount claimed by plaintiff on this account was $837,971 (Exhibit C, p. 64). Appellants do not by any exception or assignment of error question the propriety of this allowance, except to say in respect to this, as in respect to Engineering and Contingencies, that this allowance overlapped with the Master's allowance of Going Value, and therefore constituted a duplication of values. The contentions made in their brief are, however, somewhat broader than this, and will be fully considered later on.

After having determined the gross reproduction cost of structures by the method recited above, the Master (Finding 45, Rec., p. 136) determined the accrued depreciation therein. This determination was expressly founded upon the testimony of witnesses, for defendants as well as plaintiff, who had based their conclusions upon a careful personal examination of the property. The total amount of accrued depreciation deducted by the Master was $1,320,970, and the total amount deducted by him from structures only was $1,200,201 (Rec., p. 122, Table 1, Column 3). Appellants filed no exception or assignment of error directed to the Master's deduction for accrued depre-

ciation; nevertheless, they seemingly criticize it. This criticism will be noticed later.

As to Class T, Personal Property, consisting of "such a stock of supplies as the owner must have on hand to properly operate the water works plant," the Master assigned to this a net value (Record, p. 122, Table 1, column 4) of $174,686.00, although plaintiffs' claim on that account (Exhibit C, p. 64, column 9) had been $227,916.00. The method by which the Master's determination was reached is set forth in Finding 40 (Record, p. 135). The Master determined what he called the "going market value" thereof, which was in reality the wholesale price of these articles f. o. b. Denver, and refused to make any addition for overhead cost, although cost had undoubtedly been incurred in transporting these articles to convenient points of storage along the plant, in arranging them in warehouses and other such places, and in there maintaining them. From the gross figure thus arrived at by the Master ($190,000.00) he deducted accrued depreciation ($15,314.00), resulting in his final figure stated above. For obvious reasons this finding is not criticized by appellants.

Having determined the value of lands and water rights according to their present market value, as aforesaid, and having determined the present value of the structures by ascertaining the present reproduction cost thereof, and deducting therefrom accrued depreciation, and having determined the present value of Class T in the manner aforesaid, the Master found that he had thereby valued merely the "bare bones" of the plant. He had thereby ascertained the value of a "dead" plant, rather than a "live" one; a plant which had not yet begun to go, rather than one which

was going. He had valued it not as a plant in "successful operation," but as one which had not begun to operate at all.

Accordingly (Finding 46, Rec., pp. 136 to 138), having found the foregoing facts, he also found and determined that the value of the status of being a going concern which existed and was inherent in the plant of The Denver Union Water Company, but which he had not yet included in any portion of the valuation which he had already made, was $800,000. Plaintiff's claim for this item (Exhibit C, p. 64) was $1,200,000.

Appellants' exceptions and assignments of error relating to the Master's allowance for going value do not question its amount nor the propriety of the allowance, except to the extent of saying that it was already covered by the Master's allowances for Engineering and Contingencies and Interest During Construction (although the Master expressly found otherwise), and that it should not have been allowed because the Water Company possessed no definite franchise. Appellants' contentions in their brief are broader than this, and will be later dealt with.

The Master's total figure, determined as aforesaid, related to the plant as it stood on November 1, 1913. He brought it down to May 1, 1914 (Finding 47, Rec., p. 138), by deducting the actual depreciation accruing during the interval less the additions to the plant made during the same period.

The total figure thus arrived at ($13,415,899) the Master tested (Finding 47, Rec., p. 138) by comparing the same with the conclusions of all witnesses who had testified concerning reasonable value of the entire plant; by comparing the same with the cost to the

City of providing a duplicate plant, which cost he found to be in any event greater than the valuation determined by him; by a consideration of the adequacy and present condition of the plant and the character of service which it rendered, all of which (Finding 52, Rec., p. 139) he found to be excellent; and by a consideration of the question (Finding 53, Rec., p. 140) whether fair rates measured by the valuation thus determined by him would exceed the value of the service to the consumer, finding expressly that they would not.

By a consideration of all of these matters he found and determined (Finding 48, Rec., p. 138) "that $13,415,899 is the fair and reasonable value of the property used by the Water Company for the convenience of the public," and a proper rating base by which to measure the adequacy of the return afforded by the rates in question. To this determination of fair value appellants filed no exception and no assignment of error. Nevertheless, they assume in their brief to criticize it, because, as they assert, the Master did not give due consideration to the fact that the Company was without a definite franchise (although no franchise value was claimed or allowed), or to the fact that the Company was exposed to the possibility of municipal competition. This criticism will be dealt with later.

Upon the foregoing review, we submit it to be clear that the Master's determination of value was based upon correct principles, and certainly did no injustice to appellants. Every possible doubt was resolved against appellee.

Appellants' criticisms thereof, even as made in their brief, are few in number and limited in scope.

Appellants' exceptions and assignments of error are still more limited, and are of such character as to foreclose consideration of many contentions made in their brief.

So far as structures are concerned, except for their contentions mentioned above, relating to allowances for Engineering and Contingencies and for Interest During Construction, there is no exception or assignments of error upon which any contention can be based. The contentions made by appellants in this regard, other than those specifically mentioned above, are to the effect that cost of reproduction less depreciation was not the proper method of determining present value; that there was a marked variation in the estimates of different witnesses concerning reproduction cost; that the proof respecting the structures was not sufficiently full, complete and specific, and that the original cost of the structures was not sufficiently shown. Upon this record none of these contentions are open to appellants. The record brought to this court was not prepared with any such contentions in view, because none such had been made, either by exception to the Master's report or by assignment of error. Therefore the court must reject them. But it can do so with a good conscience because, as we shall now demonstrate, they are totally without merit.

3. *The Guiding Rules Adopted by the Master Were Correct and Properly Applied. As to Present Value of Structures the Master Rightly Considered Cost of Reproduction Less Depreciation the Most Significant Figure.*

In Smyth vs. Ames, 169 U. S., 466, 546, the court, after holding that present fair value was the deter-

mining factor, prescribed the method by which that value was to be ascertained as follows: "And in order to ascertain that value (1) the original cost of construction, (2) the amount expended in permanent improvements, (3) the amount and market value of its bonds and stock, (4) the present as compared with the original cost of construction, (5) the probable earning capacity of the property under particular rates prescribed by statute, and (6) the sum required to meet operating expenses, are all matters for consideration and are to be given such weight as may be just and right in each case. We do not say that there may not be other matters to be regarded in estimating the value of the property." (Numerals ours.)

In the Minnesota Rate Cases, 230 U. S., 352, 434, the court reiterated the foregoing language, and also held (pp. 449 to 456) that the value of real estate (here including lands and water rights) was to be determined according to the normal market value of similar real estate in the same locality.

These principles of valuation were duly considered and carefully applied by the Master. That the rule prescribed in the Minnesota Rate Cases was applied to the valuation of the lands and water rights has already been demonstrated. As to the rules prescribed in Smythe vs. Ames, none of them were overlooked.

Concerning "the original cost of construction," the Master found (Finding 10, Rec., p. 121) that "the original cost of many items of property cannot be ascertained because the books of predecessor companies are not available or do not disclose with accuracy what the original costs were." Nevertheless, all information available concerning original costs was

gathered and submitted to the Master and duly considered by him, as is evident from his findings. (For instance, see Finding 34, Rec., p. 132, fol. 203.)

Concerning "the amount expended in permanent improvements," the proof was full and complete. Exhibit A-55 (not produced here) was an elaborate detailed and itemized statement of these costs, by years, for each of the twenty years of the Company's life. Exhibit Z (Rec., p. 926) gave like information for the years which had elapsed since the joint appraisement of 1908. These exhibits were reinforced by the testimony of witnesses going into minute detail.

Concerning "the amount and market value of its bonds and stock," the Master found, as was the fact (Finding 10, Rec., p. 121), that "the parties agree that neither the par value nor the market value of the outstanding stocks and bonds of the Water Company aid in determining the present value of the Company's property. Therefore, the market value of these stocks and bonds was not proved on the hearing." This finding was not excepted to, nor was it made the subject of any assignment of error.

Concerning "the present as compared with the original cost of construction," this plainly calls for the ascertainment of present-day reproduction cost. Appellants say (their brief, p. 118) that in Smyth vs. Ames, *supra*, "reproduction cost is not even mentioned" as among the things which "may be considered as guides in determining the value of the public utilities plant." In this appellants are clearly mistaken. The matter of reproduction cost was in this case the subject of most comprehensive proof, by the

testimony of many witnesses and by elaborate exhibits. Very few of these exhibits have been brought to this court. The testimony of the witnesses is represented only by an abstract thereof, in which each page represents fully ten pages of the original transcript. It is, therefore, totally unreliable as a guide, if the question be as to the weight of the testimony.

Concerning "the probable earning capacity of the property under particular rates prescribed by statute and the sum required to meet operating expenses," these subjects also were fully dealt with by most elaborate and comprehensive proof, as has already been shown (*supra*, pp. 115 *et seq.*).

Accrued depreciation was determined in accordance with correct principles, and an ample allowance therefor deducted, as this court has said it should be (Knoxville vs. Knoxville Water Co., 212 U. S., 1, 10).

In short, every rule heretofore laid down by this court was carefully observed, and the result is undoubtedly beyond just criticism, at least so far as appellants are concerned.

As to appellants' suggestion (their brief, pages 83, 85 and 118) that some impropriety was involved in determining present value of structures by the reproduction-cost-less-depreciation method, it is sufficient to say that that method has repeatedly received the approval of this court. As to present value of structures, it is rightly held to be the most influential factor, and except in very rare instances, of which this case is not one, furnishes a minimum figure below which we may not go in determining fair value, either for rating or for condemnation and public purchase, and to which (after deducting depreciation actually

accrued) substantial additions must be made in arriving at the final conclusion as to fair value.

In recent appraisals of property, practically without exception, engineers, commissions and courts, particularly the Federal courts, have laid stress upon the importance of the figure arrived at by estimates of present reproduction cost less accrued depreciation. That was the method employed by the former board of appraisers and by all of the engineer witnesses for the plaintiff in this case (appellee here), and furnished a figure which had a most important influence in guiding their final judgment as to actual fair value. It was also the method employed by all of the engineer and contractor witnesses for the defendants (appellants here), and resulted in the only figure of importance which the defendants presented for the consideration of the Master or the court below, for the defendants did not, as the plaintiff did, present a final figure representing a fair value of the plant, including all of its elements, and arrived at after consideration of all relevant facts.

In Whitten on Valuation of Public Service Corporations, page 69, Sec. 72, it is said, with the citation of many authorities: "The general trend of recent decisions has been to make reproduction cost the sole or controlling basis of value for rate purposes. Some courts plainly state that in their opinion actual cost, capitalization and other factors are to be considered only to the extent that they may throw light on the cost of reproduction or existing depreciation." The many cases cited and quoted from in preceding portions of this argument illustrate this, for almost without exception present-day reproduction cost less actual accrued depreciation has as to structures been

the basic figure adopted, and this has manifestly been with the entire approval of this court. See particularly:

The Consolidated Gas Co. vs. City of New York, 157 Fed., 849, 854, *et seq.*

Wilcox vs. Consolidated Gas Co., 212 U. S., 19, 41, 52.

Knoxville vs. Knoxville Water Co., 212 U. S., 1, 9.

Lincoln Gas & Elec. Light Co. vs. Lincoln, 223 U. S., 349, 358.

Shepard vs. Northern Pacific, 184 Fed., 765, 803.

Minnesota Rate Cases, 230 U. S., 352, 436, 452.

Louisville & Nashville Co. vs. Railroad Commission, 196 Fed., 800, 820.

Moreover, the cost of reproduction must relate to the reproduction of the identical plant involved and under present-day conditions. To undertake to estimate the reproduction cost of some plant other than the identical one under consideration, or under conditions other than those which prevail at the time the reproduction is assumed to occur, to-wit, at the time of the valuation, confuses present fair value with exchange value, and leads into the realm of pure speculation, with no result but perplexity and confusion. As was said by this court in the Minnesota Rate Cases (230 U. S., 454), "the property is held in private ownership, and it is *that property*, and not the original cost of it" (nor, we may logically add, the original or present-day cost of some other or different

property constructed under conditions differing from those which actually prevail) "of which the owner may not be deprived without due process of law." The question is fully discussed in the following authorities:

The Consolidated Gas Co. vs. City of New York, 157 Fed., 849, 854.

Kennebec Water District vs. City of Waterville, 97 Maine, 185; 54 Atl., 6, 19.

Hayes on "Public Utilities, Their Cost New and Depreciation," pp. 18, 217.

Floy on "The Valuation of Public Utility Properties," p. 18.

On the subject of accrued depreciation appellants (their brief, pp. 116, 117) compare the Master's deduction for accrued depreciation with his annual depreciation allowance, and assert as the result that the accrued depreciation ought to have been doubled or the depreciation allowance halved—this though the criticism is supported neither by an exception to the Master's report nor by any assignment of error. In any event, appellants' contention is without merit. The matter has already been fully dealt with in connection with our discussion of the depreciation allowance (*supra*, pp. 147 *et seq.*). It is there demonstrated that appellants' mistake consists in an utter failure to appreciate the total amount of accrued depreciation which has actually occurred. This consists not only of the amount of accrued depreciation in existing elements deducted by the Master ($1,320,970), but also the complete depreciation upon ele-

ments which, for that reason, have heretofore disappeared from the plant, amounting to at least $1,261,000. The total depreciation which has accrued is, therefore, the sum of these, or $2,581,970.

4. *The Alleged Variation in the Estimates and Conclusions of Different Witnesses Does Not Exist.*

Appellants at pp. 83 and 84 of their brief compare the conclusions of the witnesses Freeman, Holman, Hazen and Metcalf & Anderson as to present fair value of the plant (these being the only witnesses who presented their conclusions upon that subject), and state that there is "a difference between the highest and lowest of more than $1,300,000." No such difference actually existed. Metcalf & Anderson's valuation was in round figures $16,000,000. The valuation of the former board of appraisers, as of January 1, 1908, was $14,400,000. Freeman, Holman and Hazen, members of that board, brought their former valuation to date by adding the actual cost of additions, betterments and extensions and deducting the actual depreciation which had occurred in the interval. Holman also took into consideration the increase in value of the water rights which beyond question had occurred, and which in this case was testified to by the witnesses both for plaintiffs and defendants; which increase, as also shown by the evidence, was beyond doubt at least 25 per cent. Freeman and Hazen, although stating that such increase had doubtless occurred, did not take it into consideration, because they had no personal knowledge as to its extent. All this we have hereinbefore fully demonstrated with appropriate references to the record (*supra,* pp. 25 and 26). The value of the water rights as found by

the appraisers in 1908 was $2,845,925. Twenty-five per cent of this exceeds $700,000. If this amount be added to the figure given by Mr. Freeman, or that given by Mr. Hazen, the result will be $16,000,000 or more. Metcalf & Anderson, as did Holman, gave consideration to this increase in value of water rights, their valuation of water rights as of October 31, 1913 (Exhibit C, p. 64), being $3,530,000, or substantially $700,000 in excess of that found by the former board of appraisers as of January 1, 1908. It follows that, for purposes of comparison, and giving due consideration to the facts stated above, Freeman's valuation should be taken to be $16,070,000, and Hazen's valuation $16,000,000, with which are to be compared Holman's valuation of $16,614,719, and Metcalf & Anderson's valuation of $16,000,000.

But appellants also refer (their brief, p. 84) to the figure $10,109,789, furnished by one of their witnesses, John Gaffy; also to the figure $9,915,388 furnished by a Mr. Bickel, who was likewise one of their witnesses. And on page 115 of their brief appellants positively assert that "there was a variation in the various estimates of the total value of the property of $4,000,000 or $5,000,000." The assertion is without foundation in fact and in conflict with the record. As we have already shown, there was a very close correspondence between the conclusions of the five witnesses mentioned above, who alone undertook to testify as to "the total value of the property." The figures given by Gaffy and Bickel, referred to on page 84 of appellants' brief, did not represent, nor did they purport to represent, "the total value of the property." They referred only to the gross reproduction cost of the structures, as is clearly demon-

strated by the testimony of these witnesses and the exhibits which they produced, none of which have been brought to this court.

See the testimony of Gaffy, direct examination, record, pages 687-689; cross-examination, pages 690-710; re-direct examination, pages 710-713; and Exhibits 57, 58, and 66.

See testimony of Bickel, direct examination, record, page 754; cross-examination, 755-777; re-direct examination, 778, and Exhibit 65.

The direct testimony of each of these witnesses really consisted of the very long written exhibits which each produced and filed, none of which have been brought to this court. From these exhibits and also from their oral testimony, an abstract of which is contained in this record, it clearly appears that the gross figures which they presented and which are stated in appellants' brief covered nothing but the reproduction cost of structures. They did not include, nor purport to include, Class A, Lands; Class B, Water Rights; Class T, Personal Property, or Going Value (Rec., pp. 690, 694, fol. 872; p. 760; Exhibit 57, p. 143; Exhibit 65, p. 1, and p. 67-A). Their estimates gave scant consideration to the costs in the way of Engineering and Contingencies and Interest During Construction to which the Company would necessarily be subjected, and their allowances on that account were certainly unduly low. That was a matter concerning which neither of them had ever had any experience and about which they knew nothing, as one of them frankly admitted (Rec., p. 707, fol. 888), and as is evident from the other's testimony (Rec., pp. 755 *et seq.*). These men were contractors whose experience had been limited to small

jobs, and who had never been connected with a work approaching the magnitude of that involved in the reproduction of the Water Company's plant. Their testimony and their exhibits were chiefly directed to fair contract cost—that is to say, what would be a fair contract price to be paid for the reproduction of these structures upon the assumption that the Company had done all the preliminary work of investigation and organization, and had prepared the necessary plans and specifications upon which the work would be submitted to competitive bidding; and upon the further assumption that while the contractor's work was going on the Company's organization would be maintained for purposes of administration, supervision, etc., and that the contract price would be paid in installments from time to time as the work progressed. Upon these assumptions Gaffy stated (Rec., p. 713, Exhibit 66) that a fair price to be paid by the Company to the contractor for the reproduction of the structures would be $8,361,406, and Bickel stated (Rec., p. 778) that it would be $8,662,440. The fair contract cost as found by the Master (Rec., p. 122, Table 1, Column 2, less 12½% for Company's overhead) was $8,370,078. This figure of the Master's did not, nor do those of Gaffy and Bickel mentioned above, include anything for the Company's engineering and contingencies or interest during construction. They are, therefore, strictly comparable. It is significant that the fair contract cost testified to by Gaffy and Bickel equalled or exceeded that found by the Master.

To reach the total figures mentioned on page 84 of appellants' brief, Gaffy and Bickel added to the fair contract cost of the structures as determined by

them certain arbitrary amounts, which they assumed would be costs for overhead and interest during construction to which the Company would be subjected. It is obvious, for the reasons above mentioned, that these were totally inadequate to cover the Company's costs of engineering and contingencies and interest during construction on the structures alone. To ascertain what they were, we must deduct the fair contract cost as finally determined by Gaffy and Bickel from the total figures given by each. The total figure given by Gaffy (Rec., p. 688, Exhibit 57) was $10,109,789. The fair contract cost finally determined by him (Rec., p. 713, Exhibit 66) was $8,361,406. The difference is $1,748,383, which must cover all of the Company's overhead costs upon the structures, including preliminary investigation, preparation of plans and specifications, administration, engineering and contingencies and interest during construction. The total figure submitted by Bickel (Rec., p. 755, Exhibit 65) was $9,915,388. The fair contract cost finally determined by him (Rec., p. 778) was $8,662,440. The difference is $1,252,948, which, as in the case of Gaffy, must cover all of the Company's overhead expense, including engineering and contingencies, and interest during construction. The Master's allowance for Company's engineering and contingencies (Rec., p. 122, Table 1, Column 2) was $1,046,360, and his allowance for interest during construction (Rec., p. 122, Table 1, Column 1) was $805,000. The sum of these, representing the amount included by the Master in gross reproduction cost to cover the Company's overhead expense and interest during construction, is $1,851,360. This is $102,977 more than the total allowance for these items made

by Gaffy, as aforesaid, and $598,412 more than the total allowance made therefor by Bickel, as aforesaid.

But, as we have already observed, the figures given by Gaffy and Bickel and referred to on page 84 of appellants' brief, included nothing whatever for Class A, Lands; Class B, Water Rights; Class T, Personal Property, or for Going Value. In order to obtain a figure relating to total valuation which will be comparable with that found by the Master, we must add the value of the omitted property as determined by the Master and deduct depreciation, as the Master did. The following tabulation shows the result of this. In this tabulation the total figures as given by Gaffy and Bickel are treated as the gross reproduction cost of the structures. They were offered by the witnesses in that guise.

	Gaffy	Bickel
Gross reproduction cost of structures, Classes C to S.	$10,109,789	$ 9,915,388
Class A (as found by Master, Record, p. 122).....	637,814	637,814
Class B (as found by Master, Record, p. 122).....	2,947,617	2,947,617
Class T (as found by Master, Record, p. 122).....	190,000	190,000
Going value (as found by Master, Record, p. 122)..	800,000	800,000
Total	$14,685,220	$14,490,819
Deduct accrued depreciation as found by Master.....	1,320,970	1,320,970
Present fair value.....	$13,364,250	$13,169,849

The Master's determination of present fair value was $13,415,899.

But, as already noted, the allowances made by Gaffy and Bickel for Company's overhead costs and interest during construction were obviously unduly low. Neither Gaffy nor Bickel had any experience or knowledge respecting such matters. This is either admitted by them or plainly appears from their testimony (Record, p. 707, fol. 888; pp. 755 *et seq.*). Beyond question, the allowances made by the Master for Company's overhead costs and interest during construction and found and determined by him to be correct, are, to say the least, more likely to be right than those assumed by Gaffy and Bickel. Giving due consideration to these determinations of the Master, there is, as has been shown above, in the case of Gaffy, a deficiency of $102,977, and in the case of Bickel a deficiency of $598,412. Recurring now to the tabulation set forth above, and starting with the total stated in each, before the deduction of accrued depreciation, the following tabulation is important:

	Gaffy	Bickel
Total gross valuation	$14,685,220	$14,490,819
Deficiency on overhead costs and interest during construction	102,977	598,412
Total gross value corrected	$14,788,197	$15,089,231
Deduct depreciation as found by Master	1,320,970	1,320,970
Present fair value corrected to accord with Master's determination of overhead costs and interest during construction	$13,467,227	$13,768,261

The present fair value as determined by the Master was $13,415,899. The estimates of Gaffy and Bickel, properly considered, each result in a figure representing present fair value greater than that found by the Master.

In order to compare the figures of Gaffy and Bickel with those of Metcalf & Anderson, the comparison must be made on the basis of fair contract cost as determined by each. Gaffy's fair contract cost (Record, p. 713, Exhibit 66) was $8,361,406; that of Bickel (Record, p. 778) was $8,662,440, and that of Metcalf & Anderson (Record, p. 882, Exhibit A-98. Record, p. 1033) was $9,416,861. The difference here, as will be observed, is, as between Gaffy and Metcalf & Anderson, about $1,000,000, and as between Bickel and Metcalf & Anderson less than $800,000. These

differences are fully accounted for by the fact that both Gaffy and Bickel omitted necessary items of construction and elements of cost, as was clearly evident from the detailed exhibits which they presented, none of which is produced here. Many of these omissions were admitted by them upon cross-examination. The exhibits and the testimony of Gaffy and Bickel were carefully analyzed by Mr. Metcalf, and the result of such analysis set forth in his testimony in rebuttal (Record, pp. 881 to 898) and the carefully-prepared series of exhibits which he presented in illustration of his testimony (Exhibit A-98, Record, p. 1033; A-99, Record, p. 1034; A-100, Record, p. 1049; A-101, Record, p. 1054; A-102, Record, p. 1062; A-103, Record, p. 1067). Without going into detail, we assert, without fear of successful contradiction, that, as demonstrated beyond question, the estimates of Gaffy and Bickel concerning fair contract cost failed to include or to take into consideration structures, and items of structures, and elements of costs of construction necessary to be included, and which must be included to put their determinations upon a basis which would make them comparable with that of Metcalf & Anderson. When due consideration is given to these items, the fair contract cost as determined by Gaffy and Bickel will, as the evidence demonstrated, equal, if it does not exceed, that determined by Metcalf & Anderson. It follows that if the other items included in the valuation of Metcalf & Anderson, and purposely and admittedly excluded from the figures of Gaffy and Bickel, be added to such fair contract cost, and the gross valuation thus determined be reduced by deducting accrued depreciation as found and deducted by Metcalf & Anderson, the result will be a present

fair value of $16,000,000, as also found by Metcalf & Anderson.

Beyond question, the assertion made on page 115 of appellants' brief that "there was a variation in the various estimates of the total value of the property of $4,000,000 or $5,000,000," is totally without justification or excuse and in conflict with the record. The obvious mistakes and omissions of Gaffy and Bickel, the erroneous assumptions upon which they proceeded, and the fact that they excluded certain items of structures and elements of construction cost which Metcalf and Anderson and the former board of appraisers had included, are made the subject of express findings by the Master (Finding 34, Record, p. 132; Finding 35, Record, p. 133; Finding 39, Record, p. 133; also page 134, fols. 205½ and 206). Instead of there being any material variation in the estimates of the various witnesses as to reproduction cost of the structures, there was a remarkably close agreement in their estimates; rightly considered, they were practically identical. And instead of there being a variation of four or five million dollars in the determination of present fair value as finally reached by the witness who testified in respect thereto, the conclusions of all, including defendants' witnesses, when due regard is given to items which some included and others omitted, were in substantial agreement and plainly demonstrated a present fair value of not less than $16,000,000. The present fair value as determined by the Master was $13,415,899, substantially less than that which would result from the testimony of any witness either for plaintiff or defendants. But this was largely due to the fact that

the Master excluded items which the others had included.

5. *Appellants' Contention that the Proof Concerning Reproduction Cost of Structures Was Not Sufficiently Full, Complete and Specific, and Their Further Contention that the Actual Original Cost of Structures Was Not Sufficiently Shown, Are Untenable and in Conflict with the Record.*

As we have already indicated, the contentions outlined above are not open to appellants, because of the lack of any exception to the Master's report and any assignment of error relating thereto; but, beyond this, they are in conflict with the facts, as is demonstrated even by the incomplete record which they have brought to this court. If the whole of the voluminous record which was before the Master were here, or if appellants' present counsel were familiar therewith, such contentions could not be conscientiously made; nevertheless, they are made and reiterated in appellants' brief (pp. 22 to 25, 83, 85, 91).

In so far as these contentions relate generally to an alleged lack of particularity in the proof, our answer thereto is the same as that which was made to a like contention relating to the evidence concerning gross income, operating expenses, depreciation allowance, and net income (*supra*, pp. 115 *et seq.*). The witnesses for plaintiff who testified concerning the reproduction cost of structures (Classes C to S, inclusive) were Freeman (Record, p. 195), Holman (Record, p. 210), Hazen (Record, p. 226), and Metcalf (Record, pp. 258, 881, 900). The high qualifications of these witnesses and their extended expe-

rience in construction work of great magnitude, are beyond question and are conclusively shown by this record. Messrs. Freeman, Holman and Hazen were members of the former board of appraisers which, as a board, had determined the reproduction cost of the structures, and whose detailed report is in this record (Record, pp. 27 to 65). The witnesses last named fully explained the report of said board of appraisers, the manner in which its conclusions had been reached, and the reasons therefor, producing in explanation of their testimony further exhibits. As already explained, they likewise brought the determinations of the board of appraisers down to date.

Messrs. Metcalf and Anderson prepared the Company's inventory, Exhibit C, which in its original form is before this court. As to particularity and minuteness of detail, it speaks for itself. As to structures, Mr. Metcalf was to a large extent their spokesman, Mr. Anderson expressly concurring in Mr. Metcalf's testimony upon that subject and devoting the detail of his own testimony largely to the matter of water rights. Mr. Metcalf's testimony upon the subject of structures was extraordinarily comprehensive, detailed and specific, and demonstrated beyond question the extreme care with which the subject had been considered. In addition, Mr. Metcalf prepared and produced many elaborate exhibits in illustration and amplification of his oral testimony. Very few of these have been brought to this court. Moreover, in considering the abstract, which in this record represents the oral testimony, it must never be forgotten that each page thereof is intended to be a condensed statement of what appears on at least ten pages of

the original transcript, and each sentence thereof frequently stands for what in the original was an extended discussion.

On the part of the defendants, those witnesses who testified concerning the reproduction cost of the structures (Classes C to S) were Van Diest (Record, p. 408), Gaffy (Record, p. 687) and Bickel (Record, p. 754). Messrs. Gordon (Record, p. 720) and Hill (Record, p. 739) also gave some testimony, but it was confined solely to the reproduction cost of the distribution system (Class S) and did not relate at all to any of the other structures (Classes C to R). Without attempting here to make invidious comparisons, it is fair to say that the qualifications of defendants' witnesses to testify upon the questions involved were vastly inferior to those of the witnesses for plaintiff. None of them had ever had any experience in construction work upon a large scale, and certainly none had ever been connected with a work approaching the magnitude of the reproduction of the Water Company's plant.

Mr. Van Diest was the spokesman for the Public Utilities' engineers, whose report was before the Master. The testimony of Messrs. Gaffy and Bickel has hereinbefore been considered. The testimony of Messrs. Gordon and Hill, which related solely to the distribution system (Class S), is not referred to in appellants' brief, and is properly characterized in the Master's finding (Finding 39, Record, pp. 133-134) as follows: "The estimates of Gordon and of Hill are, in my judgment, entitled to less weight than those of the other witnesses, because of the limited experience of these witnesses concerning construction work involved in the estimates, and also because

these witnesses made less careful study and investigation of this distribution system." Said finding was not excepted to, nor is it made the subject of any assignment of error.

Each of the witnesses for the defendants produced at least one exhibit and some produced several, all of which were introduced in evidence and duly considered by the Master. In the case of Gaffy, Bickel, Gordon and Hill, these exhibits really took the place of the direct examination. To some extent, at least, this was also true in the case of Mr. Van Diest. With these exhibits left out, the direct testimony of these witnesses is in reality omitted from the record and their cross-examination is largely incomprehensible; and yet none of the exhibits produced by any of these witnesses is brought to this court, except one (Exhibit 54, Record, p. 1083) of the several produced by Mr. Van Diest. Under these circumstances, we submit that the contentions of appellants respecting the structures cannot be considered. Much less can they be upheld. In so far as those contentions rest upon the claim that the evidence was lacking in scope or particularity, a mere inspection of the record is sufficient to conclusively dispose of them.

But appellants are especially insistent (their brief, pp. 22 to 25) that proof in regard to original costs was lacking, and that appellee, although evidently in possession of the facts in that regard, withheld them from the Master. There is no justification for this assertion. The Master found (Finding 10, Record, p. 121) that "The original cost of many of the items of property going to make up the Water Company's plant cannot be ascertained. The books of its predecessor companies are not available or do not dis-

close with accuracy what the original costs were." Moreover, it is clearly evident from other findings of the Master that evidence concerning original costs was before him and received due consideration (Finding 15, Record, p. 125; Finding 18, Record, p. 127; Finding 19, Record, p. 127; Finding 20, Record, p. 127; Finding 34, Record, p. 132, fol. 203). The undisputed evidence demonstrates beyond question the correctness of the Master's finding quoted above. From that evidence it clearly appeared that many of the important structures of the Water Company had either been completed or their construction begun prior to the acquisition of the plant by the present company. It also clearly appeared that the records of the predecessor companies had either not been turned over to the present company and had long since disappeared, or had been kept in such a way as to give no information concerning original costs. It also clearly appeared that, while the present company had since 1894, when it acquired the property, kept a record of construction costs, this record covered the entire construction activities in each year of the Company's life, and the accounts were not segregated, nor was it possible to segregate them, so that the costs applicable to particular structures could be separately ascertained therefrom. This was fully explained by the witnesses. As Mr. Hazen said (Record, p. 228), "It was impossible to determine from these the actual costs of particular structures, except in a few cases. That condition is not peculiar to the Denver works, but is very common in water-works operations." See, also, the testimony of Cheyne (Record, pp. 347, 348, 354), and that of Metcalf (Record, pp. 279, 285).

Nevertheless, all that could be ascertained from the Company's records concerning original costs was freely produced before the Master. Exhibit Z (Record, p. 926) gives with great particularity, by years, the actual cost, exclusive of the Company's overhead costs and interest during construction, of additions, extensions and betterments made between January 1, 1908, to which the former appraisal related, and March 31, 1914. Exhibit A-55 (not produced here) gives like information for each year of the Company's life from 1894 to March 31, 1914. These exhibits were prepared and presented by Mr. Cheyne, who fully explained them (Record, pp. 346 to 352). As already stated, the Company's records did not segregate costs so as to show the actual cost of any particular structure. This it was impossible to ascertain except in a few cases of relatively recent work; nevertheless, the plaintiff presented to the Master all the information available upon this subject. Mr. Metcalf prepared and presented an exhibit (Exhibit A-99, Record, p. 1034) setting forth fully all of the information upon this subject which could possibly be gathered, and explained it at length (Record, pp. 883, *et seq.*, 893). Moreover, Messrs. Freeman and Hazen gave the information which they had gathered concerning original costs while acting upon the former board of appraisal (Record, pp. 201, 202, 204, 207, 227, 233).

We submit that the criticisms in this regard which appear upon pages 22 to 25 of appellants' brief are wholly without justification and should not have been made.

VI.

WATER RIGHTS. THOSE INCLUDED IN THE MASTER'S VALUATION ARE THE PROPERTY OF APPELLEE AND USED BY IT FOR THE ACCOMMODATION OF THE PUBLIC. THEIR PRESENT FAIR VALUE CANNOT BE EXCLUDED FROM THE RATING BASE. THE MASTER'S VALUATION THEREOF WAS EXTREMELY MODERATE AND IS NOT OPEN TO QUESTION BY APPELLANTS.

The Master found the value of appellee's water rights to be $2,947,617 (Rec., p. 122, Table 1, Column 4; Rec., p. 130, Finding 27). The specific findings of fact and conclusions of law upon which the Master arrived at this determination of value are set forth in Findings 22 to 32, inclusive (Rec., pp. 127 to 132). These same water rights had been by the former board of appraisers valued, as of January 1, 1908, at $2,845,925 (Rec., p. 28). Between January 1, 1908, and May 1, 1914, the date to which the Master's valuation related, there had unquestionably been a marked increase in the value of water rights, amounting to at least twenty-five per cent. Defendants' testimony, as well as that of plaintiff, demonstrates this (Rec., pp. 213, 510).

Metcalf and Anderson valued them as of October 31st, 1913, at $3,530,000 (Ex. C, p. 64).

In the figures of the Public Utilities engineers (witnesses for the defendants) nothing was included on account of water rights. This is true although the engineers themselves were plainly of the opinion that

such valuation ought to be included, and Mr. Van Diest, their spokesman, admitted that it should be added. This is clearly indicated in their written report to the Public Utilities Commission (Rec., pp. 71, *et seq.*). Notwithstanding the statements contained in their report, the committee of engineers utterly failed to include in their estimate presented to the Master, any value whatever on account of water rights. Nevertheless, Mr. Van Diest, spokesman for the committee of engineers, in the course of his testimony, said, in substance (Rec., p. 414), that valuation of the water rights was entirely omitted because of lack of time; that (Rec., 416, Fol. 543) he would not undertake to say what their value was, but that they were a very valuable asset and "I think whatever value the water rights have should be included. Whatever the water rights are, I think they should be added to our estimate, but would not undertake to say what that value is."

It will be useful at the outset to determine the scope and the exact limits of appellants' contention.

1. *Scope and Limits of Appellants' Contention. It Has Been Conclusively Determined against Them by Prior Decisions of This Court and of the Colorado Supreme Court.*

Appellants' discussion of water rights will be found in their brief at pages 28 to 63. They do not at all question the Master's determination of value either in whole or in part. They do not at all question the propriety of the inclusion, at the value found by the Master ($949,500), of water rights which the Company or its predecessors had acquired by pur-

chase; on the contrary (their brief, p. 29) they expressly concede the propriety of their inclusion at the value found by the Master. Their contention is limited to the water rights which the Company or its predecessors had, under the laws of Colorado, acquired by appropriation, which they say were valued by the Master at $1,998,117. It will thus be seen that their contention is limited in scope, applies only to a portion of the water rights included by the Master, relates solely to the propriety of the principle upon which they were included, and does not involve any assertion that either class of water rights was overvalued. Plainly, so far as value is concerned, appellants are content.

In support of said contention, the substance of appellants' argument is this: that at the time of the acquisition of said water rights by appropriation the Water Company, or its predecessor, was engaged in the business of supplying Denver and its inhabitants with water; that the water rights so acquired were intended to be used in connection with said business; that therefore the Water Company and its predecessors in making said acquisitions acted merely as agents and trustees for Denver and its inhabitants, and that therefore said water rights are, and from the date of their acquisition have been, the property of Denver and its inhabitants, and not the property of the Water Company, although nominally standing in its name. The determination of this issue depends upon questions of fact as well as of law. All of the questions of fact involved were determined by the Master in favor of appellee's contentions and against those of appellants, as indeed they must have been,

because the evidence was undisputed. These findings of fact are in no manner questioned by appellants. Upon the facts so found and conclusively determined the Master held that appellants' contention upon the question of law was unsound and so rejected it. The court below confirmed this conclusion. We respectfully submit that this determination of the Master and of the court below is right, and should be affirmed. The question has been forever set at rest by the following decisions of this court and of the Colorado Supreme Court, which deal with the precise question here involved, and determine it adversely to appellants' contention:

San Joaquin, etc. Irrigation Co. vs. Stanislaus County, 233 U. S., 454;

City of Denver vs. Walker, 45 Colo., 387;

City of Denver vs. Brown, 56 Colo., 216;

People Ex Rel. City and County of Denver vs. The District Court of the Second Judicial District, decided by the Supreme Court of Colorado on July 2, 1917.

The case last cited has not yet been reported either in the Official Colorado Reports or in the Pacific Reporter, but a reproduction, in print, of a certified copy thereof is attached to this brief as Appendix B, *infra*, pp. 436 *et seq.*

2. *Nature and Ownership of the Property-Right Valued by the Master.*

In Colorado water is a commodity, and the right to divert water from the natural streams, to store

it in reservoirs, to convey it through pipes, ditches or other conduits, and to deliver it upon lands for irrigation purposes, or in communities for domestic and manufacturing purposes, a vested property right protected by the Constitution. This right is, of course, as essential to a waterworks system as the iron pipes which convey the water. In constructing and assembling a waterworks system it must be obtained, and under the conditions which prevail in Colorado at the present time must, like the iron pipes, be bought and paid for. The situation in Colorado is not like that in eastern communities, where nothing more need be done than to insert a pipe into a great freshwater lake, or into a running stream of constant and sufficient flow, and so divert the water without cost, other than that required for the structure itself. In this region necessities exceed supply. The streams are over-appropriated, and population as well as agricultural and other industries are dependent upon and limited by the available quantity of that which is essential to their existence, welfare and growth, and which in other—and in that respect more favored—regions is abundant and free.

This situation was foreseen and provided for early in the history of this state. The doctrine was early adopted, and has since been steadily adhered to, being now crystallized in constitutional and statutory provisions, that by prior appropriation, diversion and application to a beneficial use a vested property right is acquired, of which, or of the use whereof, the owner can not be deprived except by due process of law and upon just compensation.

This doctrine does not at all require that the appropriator shall himself actually make application of

the water to a beneficial use. It is entirely sufficient if this be done by others, provided only that it actually be done. And so an appropriation and diversion of water made by an individual or a corporation is just as complete and just as much a vested right of property if the appropriator and diverter of the water delivers it to others who apply it to a beneficial use, as though such original appropriator and diverter had himself made such application. This court has so decided (Gutierres vs. Albuquerque Land & Water Co., 188 U. S., 545).

In 2 Kinney on Irrigation and Water Rights (2nd Ed.), p. 1208, sec. 703, the author says:

> "Water may be appropriated by an individual or company, where the primary purpose of the appropriators is the sale of the water to others. However, the ultimate object of the appropriation must be the use of the water, by some one, for some beneficial use or purpose, and that, too, within a reasonable time after the appropriation is made. * * *
>
> Not only is the sale of water permitted but under certain conditions appropriations of water are encouraged for that express purpose. The time has come when the water in this Western country which is still unappropriated is each year becoming more and more scarce. There are very few places left where a farmer, with perhaps the aid of his neighbors, can run a plow furrow to a natural stream and there construct a brush dam and

by that means divert a supply of water sufficient to irrigate his farm. The irrigable lands left, which may be reclaimed by the use of the water, also lie further from the natural streams. The water must be taken out from the larger rivers or large reservoir and canal systems must be constructed; and all this must be at a large outlay of money. This, the consumers, as a general thing, have not got; and unless the progress of the country along these lines is to cease the money for these projects must be obtained from some source. Hence, it has been the policy of the legislation in all of the Western States and Territories in this regard to encourage large companies with great financial backing to appropriate the waters of the natural streams or other bodies, construct the works, and then sell or rent the water, or at least the use thereof, to the farmers or other consumers."

And again, the same author says (p. 1324, sec. 767):

"Not only is it unnecessary for the owner of a water right, (for irrigation), under the doctrine of appropriation, to own or possess land adjoining the stream from which the water is taken, as stated in our last section, but a perfect title to a water right may be had and maintained without the owner thereof having the title to, or in the possession of any land anywhere, with the bare exception of the easement or other right

of way for the ditch or canal to conduct the water to the place of use. * * * In fact, it has been held by the Supreme Court of the United States that corporations may be organized for the express purposes of appropriating the waters of some stream, and selling the water to consumers; that the corporations need not own or possess any land except the bare right of way for their ditch, nor need the stockholders of the corporation be a combination of land owners. (Citing Gutierres v. Albuquerque Land & Irr. Co., supra.) However, because the owner of a water right is not required to own land in connection therewith, does not dispense with the rule that all of the water appropriated must be used by someone for some beneficial purpose in order to hold the water right."

The Constitution of Colorado, Art. XVI, provides:

"Sec. 5. Water, public property.—The water of every natural stream, not heretofore appropriated, within the state of Colorado, is hereby declared to be the property of the public, and the same is dedicated to the use of the people of the state, subject to appropriation as hereinafter provided.

Sec. 6. Diverting unappropriated water—Priority.—The right to divert the unappropriated waters of any natural stream to beneficial uses shall never be denied. Priority of appropriation shall give the bet-

ter right as between those using the water for the same purpose; but when the waters of any natural stream are not sufficient for the service of all those desiring the use of the same, those using the water for domestic purposes shall have the preference over those claiming for any other purpose, and those using the water for agricultural purposes shall have preference over those using the same for manufacturing purposes.

Sec. 7. Right of way for ditches, flumes.—All persons and corporations shall have the right of way across public, private and corporate lands for the construction of ditches, canals and flumes for the purpose of conveying water for domestic purposes, for the irrigation of agricultural lands, and for mining and manufacturing purposes, and for drainage, upon payment of just compensation.

Sec. 8. County commissioners fix rates for water.—The general assembly shall provide by law that the board of county commissioners in their respective counties, shall have power, when application is made to them by either party interested, to establish reasonable maximum rates to be charged for the use of water, whether furnished by individuals or corporations."

To carry these constitutional provisions into effect, the legislature has enacted an elaborate code of statutory law. (Revised Stats. 1908, Chap. LXXII,

pp. 860 *et seq.;* Secs. 3165, *et seq.*) These statutes contain specific provisions (Secs. 3181-3187) concerning the filings to be made and the steps to be taken for the purpose of initiating and perfecting such a water right by "every person, association or corporation hereafter constructing or enlarging any reservoir or reservoirs, constructing, changing the location of, or enlarging any ditch, canal or feeder for any ditch or reservoir, for the purpose of furnishing a supply of water for domestic, irrigation, power or storage, or for any other beneficial use, taking water from any natural stream;" and the adjudication of priorities to so divert, both for irrigation purposes and for purposes other than irrigation (which are dealt with separately) is expressly authorized (Revised Stats. 1908, Secs. 3276, 3280).

These constitutional and statutory provisions plainly ordain that one who has complied therewith thereby acquires a vested property right, dating from the commencement of his work, to divert water from the natural stream, store it in reservoirs, convey it to the place of use, and there either himself apply it to a beneficial use or permanently, by sale and deed, or temporarily by lease or license, bestow upon others the right to so use it.

If the original appropriator has, by sale or deed or other permanent arrangement, bestowed upon another the right to receive a certain quantity of water from the ditch or other means of conveyance, and apply it to a beneficial use, the original appropriator has to that extent parted with a portion of his entire appropriation; but he, nevertheless, retains the rest and continues to be vested with

the right to divert the water from the stream, store it when necessary, convey it to the point of use, and there deliver it to the ultimate consumer, which, in and of itself, is a property right protected by the Constitution.

But, where as here, the original appropriator has never, by sale and deed or other like arrangement, or otherwise, or at all, bestowed upon another any permanent right to take water from the ditches, conduits or pipes, but has merely leased or licensed the right to so take for definite periods and upon specific considerations in the nature of rentals, it is clear that the original appropriator has never parted with any portion of his entire appropriation, and still retains unimpaired not only the right to divert water from the natural streams, store the same when necessary, and convey it to the place of use, but also the right either himself to apply it to a beneficial use by using it for domestic purposes in his own home, or for irrigation purposes upon his own land, or to sell to and thereby confer upon others permanent rights so to do, or, if he chooses, to continue to lease such rights to others, himself retaining the title.

These distinctions are lost sight of by appellants, and therein lies the fallacy of their argument.

It does not admit of doubt that the Colorado Constitution and Statutes authorize appropriations of water not only for the direct use of the appropriator himself, but also for *sale* or *lease* to others. Section 988 of the Statutes (R. S. 1908, p. 397) provides for the formation of ditch companies, and section 992 (p. 398) provides that any such company shall furnish water to the class of persons and for the purposes

mentioned in the certificate of incorporation "whenever they shall have water in their ditch *unsold*." In sections 3175 (p. 862) and 3264 (p. 878) the distinction between persons who have, by deed, stockholding, or otherwise, acquired a permanent right to take water from such a ditch, and those who seek or hold a temporary license, in the nature of a lease, upon such a right is clearly made.

Section 8, Art. XVI of the Constitution exists and Sections 3262 (p. 877), 3271 (p. 880) and 3272 (p. 881) of the statutes clearly were enacted for the protection of those who are licensees or lessees, as distinguished from those who, by deed from the original appropriator, or otherwise, have acquired a permanent right to take water from the ditch. And the obvious design of the sections last mentioned is to prevent the imposition of exorbitant rentals upon the lessees or licensees of such rights.

It is a fact, which appellants will not dispute, that almost without exception the large irrigation companies of Colorado have from the beginning pursued the course of selling and conveying permanent rights to take water from their ditches, rather than leasing or licensing such rights for limited periods. Plainly, under the Constitution and Statutes, either course was open to them, but they have almost invariably chosen the first. For this reason the cases which came before the Colorado courts prior to the recent ones hereinbefore cited have involved situations where the original appropriator had, by sale and deed or other permanent arrangement, bestowed upon another or others the perpetual right to take water from its ditch, and so had parted with a por-

tion of its original appropriation. In such cases the Colorado courts have definitely held that the original appropriator actually had something to sell, which it did sell when it parted with the right to apply the water diverted through its ditch to a beneficial use. Thus in Combs v. Agricultural Ditch Co., 17 Colo., 146, 150, it is said:

> "Undoubtedly those who by labor or by the payment of money actually construct an irrigating ditch may thereby acquire a prior right to the water which may be diverted therein, provided they apply the same to beneficial use within a reasonable time after such diversion. * * * Those who construct ditches and divert water for general purposes of irrigation must within a reasonable time apply the water to beneficial use; *or else, upon proper application and for proper consideration, they must dispose of the same to those who are ready to make beneficial use of it.* If ditch companies are unwilling to be charged with such duties and responsibilities they must leave the water in the natural stream." (Italics ours.)

In New Mercer Ditch Co. vs. Armstrong, 21 Colo., 357, 363, the court said:

> "The appellant argues that a corporation under our laws is allowed to divert from a natural stream water for a *speculative purpose*—that is, *to divert it for the purpose of selling to anticipated purchasers, although the corporation itself has never made any*

> *beneficial use of any part thereof.* By analogy, therefore, he contends that the same power should be given to a natural person. *We have no hesitation in accepting this conclusion* and holding that a natural person in this respect would have the same rights as a corporation, and that either might, in accordance with the doctrine announced in Strickler v. Colorado Springs, 16 Colo., 61, *sell the right to use water.*" (Italics ours.)

See also Travelers Ins. Co. vs. Childs, 25 Colo., 360, 362.

In Blakely vs. Fort Lyon Canal Co., 31 Colo., 224, there was involved a ditch company which had constructed the ditch, diverted the water, and thereafter, by instruments in the nature of deeds, sold and conveyed to others the right to take water from the ditch, and apply it to beneficial uses. Each of these deeds contained a covenant on the part of the ditch company that when water rights equal to the capacity of the ditch had been thus sold and conveyed, the company would turn over the structure itself to the purchasers of these water rights and permit them to own, operate and manage the ditch for themselves. The court there held that, having purchased water rights to the capacity of the ditch, the purchasers were under such covenant entitled to a conveyance of the physical structure, and at page 234 said, "There was nothing more vested in either of the vendor companies to sell, and purchasers of excess rights took nothing by their purchase," thereby plainly indicating that before the full capacity of the ditch had been so sold the companies did have something to sell, to-

wit, the right to take water from said ditch up to its full capacity.

See also:

Canal Co. vs. Kreybill, 17 Colo. App., 26.

In Butterfield vs. O'Neil, 19 Colo. App., 7, the court speaking of consumers of water from a ditch who had, by the purchase of ditch stock (a method sometimes adopted, 25 Colo., 144), acquired a permanent right to take and apply to beneficial use a portion of the water diverted by such ditch under its appropriation, said (p. 10):

> "And a claim of prior appropriation is equally baseless. The water was appropriated by the Cushman Ditch Company, and it was from that company and from no other source that the plaintiff derived his title. The Origin of defendant's title was the same. The rights of the parties plaintiff and defendant in the water are evidenced by the stock of the company held by them respectively,"

from which it is clear that the Cushman Ditch Company had something to sell, towit, the right to apply to a beneficial use the water diverted by it and carried in its ditch to the place of use. This it did sell and convey, the evidence of such transaction being the so-called "ditch stock," which, under the practice prevailing in Colorado, is but another name for "water deed."

Finally, in Dickson vs. Dick, 59 Colo., 583, it appeared that corporations had been organized for

the purpose of constructing irrigation works and appropriating and diverting water for irrigation uses. This they had done, but they had not themselves applied the water to such beneficial use. On the contrary, they sold to Dickson and others "full-paid water rights," for which they received full consideration, and which purported to confer upon said Dickson and the other purchasers thereof perpetual rights to take water from the ditches and apply it to beneficial uses. The companies having fallen into financial difficulties, a receiver was appointed, who refused to recognize the rights of the purchasers under their respective conveyances of such "full-paid water rights." At page 587 the court said:

> "The corporations severally sold and received full compensation for perpetual water rights and delivered the same to the respective purchasers, *thus investing the latter with dominion over the things with which the former parted* (citing cases). *Each contract in question constituted a bargain and sale which passed the property in the water rights sold.* The transaction went further than to only create rights *in personam*, to fulfillment of the terms of the contract. It created rights *in rem*, to an enjoyment of such property, and was therefore an executed contract." (Italics ours.)

The contracts provided for the execution of deeds, but the court held that the contracts in and of themselves operated as present conveyances, and then said (p. 588):

"The holders thereof severally paid for and received that which they had purchased, and have since used and enjoyed the same. * * * The contracts were not executory simply because they provided that the respective grantees therein should receive the water during the irrigation season in each year thereafter. *The grantees had severally acquired a right of property, the subject of ownership, like any other property, and to deprive them of that right would be repugnant to the Constitution."* (Italics ours.)

The case last cited plainly demonstrates that the company had something to sell and convey, and that what it did sell and convey was a valuable property right, which, in the hands of the purchaser, was entitled to the protection of the constitution, and which, in the hands of the company (if it, instead of selling, had retained it), would likewise and for the same reason be entitled to such constitutional protection.

See also:

Larimer, etc., Co. vs. Wyatt, 23 Colo. 480.

La Junta, etc., Co. vs. Hess, 31 Colo. 1.

Patterson vs. Ft. Lyon Canal Co., 36 Colo. 175.

Consolidated, etc., Res. Co. vs. Old (Colo. Sup.), 163 Pac. 78.

North Poudre Co. vs. Liggett (Colo. Sup.), 164 Pac. 1158.

It is plain from the authorities cited above that ditch companies and water companies may perfect and maintain the appropriation accomplished through their diversions by disposing of the water yielded thereby, either permanently or temporarily, to those who are ready to make beneficial use thereof.

Moreover, those to whom is made such permanent or temporary disposal of the right to take water from the conduit and apply it to a beneficial use, do not thereby themselves become appropriators from the stream, nor the proprietors of any independent appropriation whatsoever. They thereby obtain merely a right to share in the appropriation belonging to the ditch company or water company, and inseparably appurtenant to its diverting works. And the nature of the right which they thus obtain, its scope and limits and its duration, are conclusively fixed by the terms of the instrument which conveys it.

Not only this, but even after the ditch company or water company, which was the original appropriator, and through whose works the diversion from the natural stream was made, has permanently conveyed to others perpetual rights to take water from its conduits, it still retains a distinct and valuable property right in the appropriation itself, in addition to its ownership of the diverting works.

In Wheeler vs. Northern Colorado Irrigation Co., 10 Colo., 582 (the case principally relied upon by appellants), Judge Helm said (p. 588):

> "The Colorado doctrines of ownership and appropriation (as declared in the Constitution, statutes and decisions) necessarily give the carrier of water *an exceptional*

status; a status differing, in some particulars, from that of the ordinary common carrier. Certain peculiar rights are acquired in connection with the water diverted. It is unnecessary now, however, to enumerate these rights in detail." (Italics ours.)

In Farmers High Line Canal & Reservoir Co. v. Southworth, 13 Colo., 111, the same judge held (p. 119) that the consumer of water from the irrigation ditch was not an appropriator from the stream and had no independent priority and no right, except as he diverted water from the ditch under the priority appurtenant to that particular ditch, saying (p. 120):

> "But the consumer himself makes no diversion from the natural stream. * * * * The carrier makes a diversion both in fact and in law."

The learned judge further held that the consumer had no right, after having taken water from the irrigation ditch, to divert it directly from the stream on the priority adjudicated to the ditch, saying (p. 122):

> "But when he elects to take from the carrier's canal, and thus to employ this lawful agency, he cannot reject the accompanying lawful obligations. * * * p. 123) By virtue of its (the statute's) provisions a priority was to be awarded the carrier's canal according to the date of diversion of water thereby from the natural stream, and the quantity diverted and used; but no distinct and independent priority in the consumer was in any way recognized."

And speaking of the contention, which he expressly negatived, that each consumer of water from the canal had an appropriation and a priority of his own, the learned judge further said (p. 125):

> "*Besides, certain consumers will abandon the use of water from the carrier, and other consumers will secure the right to the use thus abandoned.* In each case of this kind the old priority must be dropped and the new priority recognized,"

if the theory mentioned above, which the learned judge expressly rejected, were correct. (Italics ours.)

In Wright vs. Platte Valley Irrigation Co., 27 Colo., 322, the court, in reply to the argument that the consumer of water from the ditch was the owner of the appropriation, said (p. 329):

> "It is true, as has been frequently announced by this court, that a ditch company is not the owner of the water it diverts through its ditch; *neither is its status in the strict legal sense of the term that of a 'common carrier.' * * * Its status is more like that of a private carrier, whose duties are measured by the obligations it assumes towards its consumers and such as the law imposes by reason of the nature of the business in which it is engaged.*" (Italics ours.)

In Combs vs. Farmers High Line, etc., Co., 38 Colo., 420, it is distinctly held that the individual consumer is not an appropriator from the stream; that the appropriation is appurtenant to the ditch or other

diverting works; that the owner of such ditch or diverting works, being the diverter of the water from the natural stream, is entitled to a decree therefor, even though he may, by deed or otherwise, have permanently disposed of the right to apply the water to a beneficial use, and that the individual consumers who have thus acquired perpetual rights to take water from the ditch or other conduit are confined to the use of the water yielded under the priorities decreed to the ditch itself. In the course of the opinion the court says (p. 431):

> "The decree embodies the rights not only of the carrier, *whatever they may be,* but also the rights of its consumers." (Italics ours.)

In O'Neil vs. Fort Lyon Canal Co., 39 Colo., 487, the same situation was presented and the same ruling was made. In the course of the opinion the court said (p. 493):

> "Such appropriation consists of two acts: the diversion of water from a natural stream and the successful application thereof within a reasonable time thereafter to some beneficial use. Where the consumer of water makes the diversion himself, a completed appropriation is made by the same person; but where the diversion is made by a carrier and the successful application is made by another, who is a consumer, a completed *appropriation is the result of their combined acts.*" (Italics ours.)

In the cases hereinabove quoted from the application to a beneficial use had almost invariably been

made by those to whom the diverter and carrier of the water had, by deed or like arrangement, conveyed a permanent and perpetual right to take and so apply the water. This is so because, as we have already said, it has from the beginning been the almost universal practice of ditch companies to convey such permanent and perpetual rights by deeds or their equivalent, instead of conferring merely temporary rights, of short duration, by instruments in the nature of leases or licenses. Nevertheless, it has always been recognized, as was said in Wright vs. Platte Valley Irrigation Co., *supra*, that the status, the rights and the duties of the ditch company or water company "are measured *by the obligations it assumes toward its consumers.*"

But in three very recent cases, in which the City and County of Denver (appellant here) was itself party litigant, occupying the same position here occupied and making the same contentions here made by the appellee Water Company, and in the last of which at least the City and County of Denver was represented by the same learned counsel who appears for it here, the Supreme Court of Colorado definitely defined the status of the diverter and carrier of the water and the status of the recipient thereof who applied it to a beneficial use, and their relation one to the other, in those instances where the completed appropriation had been originally perfected and thereafter maintained by the concurrent acts of two parties or two sets of parties,—namely (1) the diverter and carrier and (2) the applicant or applicants to a beneficial use,— as distinguished from the situation where one party or one set of parties had performed all of the acts requisite to the perfection and maintenance of an

appropriation, including the diversion, the carriage and the application to a beneficial use; and upon the situation before it, which was of the character first above mentioned but involved the further condition that those who had applied the water to beneficial use had done so, not under permanent and perpetual rights so to take and apply it, but under rights merely temporary in character, limited to definite periods, and in the nature of licenses, the Supreme Court of Colorado in the recent cases mentioned definitely and conclusively held that the entire appropriation, including not only the right to divert and carry, but also the right to apply to a beneficial use, or to sell or otherwise dispose of the latter right to others, remained vested, unimpaired and undiminished, in the ditch company or water company which made the diversion.

In the recent cases mentioned above the distinction is clearly pointed out and defined between the situation where the diverter and user is the same and the situation where the diverter and carrier is one and the user another. And in respect to the latter situation, the further distinction is clearly pointed out and defined between the case where the appropriation has been perfected and thereafter maintained, through application of water to beneficial uses, by those to whom the diverter and carrier has, by deed or other permanent arrangement, conveyed a perpetual right to take water from the ditch or other conduit under the appropriation, and the case where the right to take from the ditch or other conduit and apply to a beneficial use, and so at first perfect and thereafter maintain the appropriation, has been temporary and

occasional only, and conferred by way of license from time to time and for definite and limited periods upon a succession of users. And in the recent cases above mentioned the Supreme Court of Colorado has also definitely and conclusively determined that in the situation last described, the appropriation is, in the first instance, perfected, and thereafter fully maintained and protected, through application of the water to beneficial uses by such temporary licensees; but that the entire appropriation so perfected, maintained and protected, including not only the right to divert and carry, but also the right to apply to a beneficial use, or to sell or lease the right last mentioned to others, remains wholly vested in the diverter and carrier of the water.

The recent decisions to which we refer are those cited at the beginning of this portion of our argument, and are reported as follows:

City of Denver vs. Walter, 45 Colo. 387;

City of Denver vs. Brown, 56 Colo. 216;

People ex rel. City and County of Denver vs. The District Court of the Second Judicial District, decided by the Supreme Court of Colorado on July 2, 1917. (*Infra*, Appendix B, p. 436.)

These cases are controlling upon the question here under discussion, and are deemed of sufficient importance to justify extended quotations from the opinions therein.

In these cases was involved what is commonly known as the City Ditch, being the ditch of The Platte

Water Company, in Water District No. 8, to which many references were made in the testimony in the case at bar relative to water rights. To a clear understanding of these decisions, the history of this ditch and of the City's connection therewith is essential; it is thus given by the Supreme Court (56 Colo. 220):

> "In 1860 The Capitol Hydraulic Company was organized under a special act of the territorial legislature of Kansas. This act did not contain any limitation as to the period of the existence of the corporation it authorized to be created, and empowered it to divert the water from the bed of the South Platte River, at any point selected between the Platte Canon and the mouth of Cherry Creek and *conduct the water so diverted to the cities of Denver, Auraria and Highlands for mechanical, agricultural, mining and city purposes.* The purpose of the company was to construct a ditch to carry water to irrigate trees within the municipalities named, and also to furnish water to farmers cultivating land under the ditch. The construction of the ditch was commenced in 1865. In 1867 the name of the corporation was changed to **The Platte Water Company.** In 1875 or 1876, this company entered into a contract with the City of Denver, whereby it leased the ditch, as then existing, with all its rights, privileges and franchises, to the city, and also agreed to sell to the city the ditch and rights leased for the sum of sixty thousand dollars, with interest, in six annual install-

ments. These payments were made and the city then became the beneficial owner of the ditch, and such rights connected therewith as the vendor could convey. Prior to the commencement of the construction of the ditch, other ditches on the river were purchased by the original company. In 1883, under a statutory adjudication of water rights for the purpose of irrigation, the ditch was awarded priority No. 1 of date November 28, 1860." (Italics ours.)

From the foregoing statement it is clear that the original appropriation was expressly authorized and made for the purpose of conducting "the water so diverted to the cities of Denver, Auraria and Highlands (all now embraced in the City and County of Denver) for mechanical, agricultural, mining and city purposes." This is a much more express dedication to a particular use, and to the use of certain communities and their inhabitants, than is true in the case of the water rights of The Denver Union Water Company. The city having in 1875 purchased the ditch, stepped into the shoes of the original ditch company, and occupies a position toward the consumers of water from that ditch analogous to that of The Denver Union Water Company toward the city and private consumers from its system. Both before and after the city acquired the ditch, various farmers and other water users had obtained rights in respect to the use of the water conveyed thereby.

In Denver vs. Walker, 45 Colo., 387, 388:

> "Plaintiffs, who are owners of two adjoining five-acre tracts of land situate in the city of Denver, designated in the record as lots 5 and 6, and who also claim to be owners, through their grantors, of an independent appropriation of the right to the use of water for irrigating these tracts, and to utilize the same through a ditch belonging to the defendant city, brought this action against defendants, the city council of Denver and its board of park commissioners, who have immediate supervision and control of the City Ditch, to restrain defendants from doing certain acts which it is alleged they are about to do, or by a mandatory writ compel them to make such changes in their plans already carried out, which, unless the appropriate relief is given, will result in depriving plaintiffs of their alleged water right."

But the court denied the plaintiffs' claim. The court held (p. 389) that the mere fact that the plaintiffs and their predecessors in title had for many years diverted water from the City Ditch and used it upon these lands did not constitute an original or independent appropriation nor initiate any right; and that if plaintiffs had any right in respect thereto, it must have been by virtue of a contract with the owner of the ditch. And (p. 392):

> "The rights of an independent appropriator of water, and of one whose only right

> to have water carried and delivered to him is the result of contract, are not the same, but in many respects essentially different."

And the court held that the ditch owner (in this case the City of Denver) was under no obligation to continue to deliver such water to the plaintiffs, and could, "in the exercise of its undoubted legal right," so change the line of the ditch as to deprive plaintiffs of the possibility of obtaining water therefrom.

But in City of Denver vs. Brown, *supra*, the question is settled beyond further debate. In that case (p. 218):

> "Appellee Brown, on behalf of himself and others similarly situated, commenced an action against the city and county of Denver, and others, the purpose of which was to adjudicate rights to the use of water from a ditch designated in his complaint 'The Platte Water Ditch,' but more generally known as the 'City Ditch.' Various consumers appeared and were made parties."

At page 220, the court recites the history of the ditch, as above quoted. The court then continues (p. 221):

> "At an early date individuals began to take water from the ditch for the purpose of irrigating lands. The water thus obtained was secured under contracts entered into from time to time, between this class of consumers and the then owners of the ditch. These con-

tracts were only for the irrigating season during the year they were executed; that is, they only covered the irrigating season for the year they were made. The testimony discloses that in many instances, at least, the use of water by these consumers was intermittent; that is, they would contract for and use it a year or so, and then cease to contract for or use it for a period, when they would again resume the use of water in the same intermittent way. On this testimony the court held that these consumers were in no wise affected by the contracts made with either the city or its predecessors, for the reason that they were appropriators, to all intents and purposes, from the river, with the right in the city to exact a reasonable compensation for carriage, and that the rights thus acquired vested and continued from the date the consumers or their predecessors first utilized water from the ditch unless lost by abandonment. Error is assigned on this ruling."

The court thereupon reviewed the authorities, citing and construing the entire series of Colorado decisions which had preceded, including Wheeler vs. Northern Colorado Irrigation Co., *supra;* pointed out the difference between the status of those who by outright purchase or other permanent arrangement had acquired a perpetual right to water diverted by and flowing in the ditch, and the status of those who were licensees only, under temporary contracts for limited periods, such as one irrigation season. Rela-

tive to the latter class of users, the court says (p. 223):

> "When, however, his contract expires by limitation, and is not renewed, and he does not take the necessary steps to preserve the status growing out of his contractual relation with the carrier, his rights to a future use of water from the ditch cannot be based upon past use. In other words, his contract with the carrier is for carriage, and his rights are limited by its terms, so far as valid, to the volume of water for the period mentioned in his contract. On the expiration of his contract he may be entitled to have it renewed, unless inhibited by a valid provision therein; but if a legal demand for that purpose is not made, he is in the same position as though he had never taken water from the ditch.
>
> A consideration of the duties and obligations of carrier ditch companies conveying water for irrigation purposes for hire and the rights of contract users and others who can beneficially apply water from the canals of such companies to the irrigation of lands, *will demonstrate that the rights of contract users of water from companies of that character are measured and limited as indicated.* When such a company has water subject to its control, bona fide applicants are entitled to its use for irrigation purposes upon tender of the lawful rate for carriage and compliance with the reasonable rules of the carrier.

Combs v. Agricultural D. Co., 17 Colo. 146, 28 Pac. 966, 31 Am. St. Rep. 275; Golden Canal Co. v. Bright, 8 Colo. 144, 6 Pac. 142; Wheeler v. Northern Colo. I. Co., *supra*.

As previously noted, the object of a carrier company is two-fold, namely: To aid consumers in obtaining water, and for its private gain. When a mere contract consumer severs his relation with the carrier, the latter is not required, for that reason alone, to permit the volume which it had theretofore diverted from the stream for the benefit of the consumer to remain in the source of supply. If the rule were otherwise, and a contract consumer became an appropriator from the river, in the full meaning of that term, as held by the trial court, then the carrier would be compelled to await the pleasure of the contract consumer with respect to the use of water after once contracting with him, and its revenues would be dependent upon his whim, while others in the interim would be deprived of the use of the volume which the prior contract consumer had once utilized, but had ceased to use. The law does not permit such unjust and anomalous results to grow out of the relation of carrier and simple contract users. The priorities awarded a carrier ditch are for the benefit of those entitled to use the water which they represent. This means those who are entitled to be supplied with water from the ditch, to which the priorities are awarded. When these rights are evidenced by a contract between the con-

sumer and carrier, for a specified volume for a specified period, the obligation assumed by the carrier is to deliver that volume for the period and purpose named in the contract. That is all the consumer contracted for. Such a contract is in no sense illegal or against public policy, and the consumer will not be heard to say that this contract conferred greater or different rights than those specified, save and except that having once become a contract user, he will be entitled to continue that relation from year to year thereafter, without intermission, however, unless limited in the exercise of this right by a valid provision in his contract, upon tender annually of a lawful rate of carriage, and compliance with the reasonable regulations of the carrier. The rights of the contract consumer as thus defined, afford full protection to all. *When the consumer's contractual relations with the carrier are severed, the obligations of the carrier are ended, and the consumer cannot complain because the rights of others have intervened by contract with the carrier for the use of water.* That is their right, when the carrier has water undisposed of; and if it refuses the request of bona fide applicants, it can be compelled to comply with their needs to the extent it has water which it can lawfully control. If a mere contract user becomes an unqualified appropriator of water from the river supplying a carrier ditch, then certainly he ought to be required to compensate

the carrier for the carriage of water, whether he is using it or not; and yet, we apprehend that when his contract expired, if the carrier should undertake to exact such compensation, his complete defense would be that his contract did not impose any such an obligation. *The unjust results which would follow in ruling that a mere contract user is an unqualified appropriator make it apparent that his right is limited by the terms of his contract, so far as valid, and that when he voluntarily ceases, at the expiration of his contract, to exercise his right to continue his contractual relations with the carrier, or preserve the status growing out of that relation, that his future rights only date from the time he again contracts with the carrier for water,* or makes a demand to be supplied with water in circumstances with which the carrier is legally bound to comply." (Italics ours.)

In response to the argument that the city's right in the appropriations of the ditch and the product thereof had been lost, or in some degree lessened, by the practice of making such contracts, the court says (p. 233):

> *"We are also of the opinion that the use of water under these contracts by consumers, bound by the limitations imposed, preserved the status of the city the same as though it had utilized the water covered by these contracts for its own needs. In other words, by these contracts it leased its rights to the*

water which it had acquired as a consumer above that necessary for its present needs, and hence preserved them to all intents and purposes exactly as though it had continued the use of such water. The Cache La Poudre Ir. Co. v. Larimer and Weld Co., 25 Colo. 144, 53 Pac. 318, 71 Am. St. 123." (Italics ours.)

The court concludes the opinion as follows (p. 235):

> "In fixing the rights of individual contract consumers the decree must provide, in an appropriate way, for the payment of lawful carriage rates, and that while the decree will put in permanent form the relative rights of contract consumers, it must be borne in mind that these rights are based upon contracts, and that they may be lost, if the parties only intermittently avail themselves of the right to exercise and enjoy them. The decree should make appropriate provision in this respect, so that the city, as well as the bona fide applicants for water from the ditch in the future, may be fully protected."

Clear as are the determinations of the Supreme Court in the Brown case, *supra*, they are rendered still clearer and more definite by the court's own analysis thereof given in the last decision cited above.

It appears that after the Brown case was decided and, upon reversal, remanded to the lower court, the

latter court was proceeding to enter a decree in conflict with the mandate of the Supreme Court as evidenced by its prior opinion. Thereupon the City and County of Denver, acting through its present city attorney, instituted in the Supreme Court an original proceeding in mandamus seeking a mandate directing the court below to enter a decree in conformity with the Supreme Court's decision. The City's petition was granted and the writ of mandamus issued; the decision was announced and the court's opinion thereon filed on July 2, 1917. Said opinion is hereinafter set forth at length (Appendix B, hereto, *infra*, p. 436). The Supreme Court held that the determinations made in its former opinion had been so clear and positive as to render the duty of the court below merely ministerial and therefore properly the subject of mandamus. In defining what had been held in the former opinion and the consequent duty of the lower court under the mandate, the Supreme Court said (Appendix B, *infra*, p. 437):

> "The City and County of Denver as the proprietor and owner of the ditch *and in possession of its decreed appropriations,* brought the case here for review. The trial court in that case decreed and held that the consumers from the ditch were the appropriators from the stream with vested perpetual water rights in the ditch for the amount used, which accrued and continued from the date water was first utilized from the ditch on the lands of the consumers, regardless of the amount contracted for, and, being the appropriators from stream owning the ditch

appropriations, they were in no way affected by their contractual relations with the ditch owner, or by cessation in the use of water short of abandonment. In November, 1913, we reversed the case and handed down a written opinion in which we held this ruling and decision of the district court, under the circumstances of this case, fundamentally wrong in every particular; *that the original company constructing and owning the ditch as well as its successors in interest were in possession of and controlled the appropriations* and must be treated as a ditch owner carrying water for hire, that is, a carrier ditch as distinguished from water users who own the ditch and its appropriation, and also as distinguished from mutual ditch companies in which stock issued to the members represents the consumer's interest in the company, ditch and water; that the water was obtained each year from this carrier ditch by contracts between the respective consumers and the ditch owner entered into annually; *that the consumers were all contract users and that the consumers' rights depended upon and were limited and controlled by these contracts; that the contract user was not an appropriator from the stream, nor the proprietor of an appropriation, nor the owner of a water right in the ditch in the full sense of these terms; that while the ditch company was not the owner of the water, it nevertheless owned*

the right to divert the decreed appropriations awarded the ditch and to charge a rental annually for its carriage, which in effect constituted it the proprietor of the appropriations; that the ditch owner owned, controlled and possessed the right to divert the ditch's decreed appropriations, and, the consumer having contracted for and used a specific volume for a certain year, had the option and was entitled to contract for the same amount each succeeding year upon tender annually, without intermission, of the lawful rate; *that when the contract expired, if he ceased further use from the ditch, he would then be in the same position in the future as one executing a new contract; that his right each year to water from the ditch is not a perpetual right, but is limited by the terms of an annual contract; that when the consumer severs this contractual relation by not renewing the contract, the contractual obligation of the carrier with the consumer is ended, except of course, that the consumer has an option to renew the contract within a definite time from year to year, and if he fails to do so the owner may contract the use and carriage to another* who would possess the right of renewal each year until he ceases in the use; that the contracts measure and limit the consumer's right, and in addition contain a privilege or option to purchase the use of so much water annually, if exercised within a certain time each year, without intermis-

sion; that a contract user has a right to continue by contract in the future use as against subsequent purchasers, *but when he ceases to contract and use the water, he loses the right as against intervening purchasers and his future right to water, if any is obtainable, will begin from the time he again contracts.* As to the reservation in the right of way deeds, we held the right reserved, constituted an option which the consumer must exercise each year and if he neglected to do so, he stood on the same plane as other contract users. As to the excess water, which term will be comprehended by those familiar with the litigation, *we held the limitations imposed by the city upon the users of this water were in effect a lease of the amount not necessary for the city's present needs and preserve the water privilege in the city the same as though it had continued in the use.* As to the parties who, from their pleadings and proof, had not established under the rule announced in our opinion, that the city was under obligation to furnish them water, we held they were without rights that could be adjudicated or recognized in that suit." (Italics ours.)

The opinion above quoted is the last expression of the Supreme Court of Colorado upon the question here involved. It is there plainly declared:

> "That, while the ditch company was not the owner of the water, it nevertheless

> owned the right to divert the decreed appropriations awarded the ditch, and to charge *rental* annually for its carriage, *which in effect constituted it the proprietor of the appropriation.*"

And that if the consumer fails to renew his contract:

"The owner (the ditch company) may contract *the use* and carriage to another." Clearly, such a contract might be either (a) in the nature of a lease or license for a definite period, in which event the rental would cover, as the court expressly says, not only the "carriage," but also "the use," and the rental would be measured by the value of that demised, including not only the right to have carried but also the right to take and use; or (b) a contract, in the nature of a deed, conveying a permanent and perpetual right to "the use and carriage," in which event the purchase price would be measured by the value of that permanently conveyed, to-wit, not only the right to have carried, but also the right to take and use.

As to the observation embraced in the foregoing quotation that "the ditch company was not the owner of the water," it is sufficient to say that, under the constitution and laws of Colorado relating to water rights, title to the water itself is never acquired; it remains constantly and at all times, as declared in sec. 5, article XVI, of the Constitution, "the property of the public." That which appropriators, under the laws of Colorado, obtain is not title to the water diverted, but merely the right to divert from the natural stream and apply to a beneficial use such

volume of water as the appropriation, considering its date and its relation to other appropriations, will afford.

Wheeler vs. Northern Colo. Irr. Co., 10 Colo., 582, 587, 588.

Crippen vs. White, 28 Colo., 298, 302, 303.

Monte Vista Canal Co. vs. Centennial Co., 22 Colo. App., 364, 368.

It was the *water right* as thus defined, and not the water itself, which was the subject of valuation in the case at bar.

The foregoing authorities conclusively establish the following propositions:

(1) A valid appropriation may be made of the right to divert, store and convey water either for the use of the original diverter or for sale, lease or license to others.

(2) A valid appropriation is made by diverting, conveying to the place of use, and within a reasonable time applying, or causing to be applied, and thereafter continuing to apply, or cause to be applied to a beneficial use.

(3) So far as concerns the application to beneficial use, which in the first instance perfects and thereafter protects and maintains the appropriation, this may be made either by the diverter and carrier of the water, or by those upon whom he has conferred the right to take the diverted water from the conduit and apply it to such use; in either event the appropriation is as well perfected, protected and maintained.

(4) When the appropriator has constructed the diverting and carrying works, has diverted the water

and arranged to carry it to the place of use, he has a reasonable time thereafter within which to apply it, or cause it to be applied, to a beneficial use; if at this point he elects, instead of himself applying it to such beneficial use, to cause it to be so applied by others, he has his choice between two methods; these are (a) to confer upon others, by deeds or their equivalents, permanent and perpetual rights to take water from his conduits and apply it to beneficial use; or (b) to confer upon others, by leases, licenses or their equivalents, temporary rights of that character strictly limited as to time.

(5) If the diverter and carrier confers upon others permanent and perpetual rights to take and use for beneficial purposes, and if within a reasonable time they begin and thereafter continue to do so, the entire appropriation is perfected, protected, and continuously maintained; but the ownership thereof is divided between (a) the diverter and carrier, who owns and continues to own the diverting works and conduits, with the right to possess, maintain and operate them, and also owns and continues to own the right to divert, store when necessary, and carry to the place of use, and (b) the user who owns and continues to own a permanent and perpetual right to take water from the conduit at the place of use and there apply it to a beneficial purpose.

(6) If, however, the diverter and carrier confers upon others not permanent and perpetual rights so to take and use, but merely temporary rights of that character evidenced by a continuous series of leases or licenses, and if, pursuant thereto, the lessees or licensees apply and continue to apply the water to beneficial uses, the entire appropriation is, neverthe-

less, and as fully as in the former case, perfected, protected and continuously maintained; but in such event the title to the entire appropriation, including not only the right to divert, store and carry, but also the right either to use or to sell or lease to others the right to take and use for beneficial purposes, remains unimpaired and undiminished in the ownership of the original appropriator.

(7) Whenever, in the case last stated, the temporary right to take and use, conferred by such a lease or license, terminates, the diverter and carrier has, for sale, lease or license to others, the right to take and use, which, as part of the entire appropriation owned by him, has been in the manner stated fully protected and continuously maintained.

(8) If the diverter and carrier, as owner of such right, should elect to sell it, he would expect to receive therefor its reasonable market value; if it should be taken from him by condemnation, he would have an absolute constitutional right to its full value for the highest use to which it was adapted or available.

(9) If the diverter and carrier, as owner of such right, should elect to lease it, he would expect to receive as rental therefor at least a reasonable net return upon its present market value; and if said right should be devoted to a public use, such as supplying a community with water for domestic and other purposes, and the rates charged for such service should be subjected to public regulation, he would have an absolute constitutional right to such rates as would provide a reasonable net return not only upon the present fair value of the lands and structures constituting the diverting works, the storage reservoirs and the conduits, but also upon the present fair value of

the additional property right owned by him, consisting of the right to take water from the natural streams, store it when necessary, convey it to the place of use, and there either use it himself or permit its use by others.

(10) The proposition last stated is an inevitable corollary of the others, because if one has property which he may sell and does sell, he thereby obtains a return of capital; but if, instead of selling it, he permits its use by others for a fair compensation, he has at least a right to a reasonable return upon the amount of capital which he might have withdrawn, but which, for the accommodation of others, he has permitted to remain invested.

This vested property right to divert, store, convey, deliver and apply, or cause to be applied, to a beneficial use, is not perpetually attached to any certain tract of land, or any definite geographical area, or any particular consumer or community of consumers, or even to any specific beneficial use. The point of diversion, the place of application, and the character of use may all be changed without affecting the vested property right acquired by the original appropriation and diversion.

Kinney on Irrigation and Water Rights (2d Ed.), Vol. 2, p. 1501, sec. 857; p. 1522, sec. 867; p. 1527, sec. 869;

Strickler vs. City of Colorado Springs, 16 Colo., 61;

Ironstone Ditch Co. vs. Ashenfelter, 57 Colo., 31, 39 to 40.

The right to use water for irrigation, though deemed real estate, may be acquired and transferred separate and apart from any land.

Davis vs. Randall, 44 Colo., 488, 492;
Hotter vs. Kimsey (Colo. Sup.) 163 Pac., 75.

Of such a water right it is said in Kinney on Irrigation and Water Rights (2d Ed.), Vol. 2, p. 1326, sec. 768:

> "The distinct, exclusive, usufructuary estate acquired by an appropriator to the use of water, by its lawful appropriation, is property of the highest order and oftentimes of the highest value. The water right is protected by the law as such, and is subject to all of the usual incidents of property. This property right in water is as important, as valuable, and as extensive as the use to which it is applied, and especially so where that use is the irrigation of lands. The land is comparatively valueless without the water to irrigate it. Without the water it can be purchased for from $1 to $2 per acre, but with the water its value at once jumps from the above prices to $100 to $200 per acre, and sometimes to a very much higher price. The property in a water right consists not alone in the amount of water claimed under an appropriation, but also in the priority of the appropriation. And it very often happens that the chief value of an appropriation con-

sists in its priority over other appropriations from the same stream. Hence, to deprive one of his priority to appropriate would be to deprive him of a most valuable property right. A perfected water right is a vested property right and its value capable of estimation in money, and one which the law protects. A water right is such a property right that it comes clearly within the Constitutional provisions that property shall not be taken or damaged for public or private use, except upon due process of law and upon just compensation. A water right is such property that it is capable of being estimated in money. And one who has acquired a legal water right can only be deprived of it by his own voluntary act in conveying it to others, by abandonment, forfeiture under some statute, or by operation of law. And, as long as one is the owner of a valid water right it is such a property right that he has the right to exercise complete dominion, control, and management thereof. The owner may change the use of the water to any other beneficial use, so long as the change does not interfere with the vested rights of others."

Pursuant to the constitutional and statutory provisions hereinbefore referred to, and in reliance upon the well settled doctrine hereinbefore stated, each of the various Water Companies which appear in appellee's chain of title and appellee itself have been organized under the laws of Colorado, and in compliance therewith. Their various articles of incorpo-

ration authorized them to acquire by lawful appropriation, purchase or otherwise, the right to divert the waters of the natural streams, to store them, to convey them through ditches, canals, pipes and other conduits, and to apply them to beneficial uses, either directly or through others upon whom, by license or otherwise, the companies might from time to time confer such right. By lawful appropriations, duly made in full compliance with the Constitution and Statutes of the State, appellee and its predecessors received by direct grant from the State, under clear constitutional and statutory authority, vested property rights to take certain quantities of water from natural streams and apply it or cause it to be applied to *any* beneficial use, which rights they immediately perfected and thereafter fully protected and constantly maintained by actually making the contemplated appropriations and diversions, and continuously causing the waters diverted thereunder to be applied to various beneficial uses, either by the companies themselves or by others upon whom, as they were lawfully empowered, they, from time to time, conferred that privilege.

Cache La Poudre Co. vs. Larimer and Weld Co., 25 Colo., 144, 159-151.

These companies have not at any time sold or otherwise permanently parted with the right to apply to *any* beneficial use the waters diverted under their appropriations, or any part thereof. From the beginning, both in respect to the municipal corporation of Denver itself and in respect to the individual consumers, the relation has been that of licensor and

licensee. This relation has been constantly maintained and studiously safeguarded.

So far as the municipal corporation itself is concerned, a series of contracts has existed, beginning with the year 1870, by each of which the City has, for a definite consideration and for a specified period of time, been permitted to take from the conduits and mains of the Water Company water for certain beneficial uses, municipal in character. These contracts with the City did not constitute a sale or other conveyance of a perpetual right to take this water and apply it to a beneficial use; on the contrary, they were licenses only, for definite periods, relatively short, and at stated prices, and the right conferred thereby entirely ceased at the expiration of the period specified in each of said contracts.

As to private consumers, a like relation has always existed, and from the beginning has been rendered definite and unmistakable by explicit writings. No consumer has ever been permitted to take water from the mains of the Water Company, or any of its predecessors, except upon entering into a definite written contract, expressly defining the relation as that of licensor and licensee, for a limited period and upon a stated consideration to be paid.

All this is the subject of a definite and specific finding by the Master (Finding 24, Rec. p. 128). That finding was not excepted to, no assignment of error is directed thereat, and it is not in any manner questioned. It is, of course, conclusive. Moreover, it was based upon abundant proof, which was wholly undisputed. (Ex. ZZ, A1, A2, A3, A34, A35, A36, A61; Rec., pp. 927-941; also Rec., pp. 318, 322.)

It admits of no doubt that the relation between the Water Company and its predecessors on the one hand and the City and private consumers on the other, has always been that of licensor and licensee. Neither the City nor any private consumer has been, nor under such circumstances could be, the original appropriator of the water, nor the owner of the vested right to divert, store, convey and deliver. They have never had the right even to apply the water to a beneficial use, except as they have received that right under license from the Company for fixed short periods of time. Whenever a private consumer has allowed his license to lapse by failure to renew, or has abandoned or forfeited the same, the company has had the right, which it has exercised, to apply the water to other beneficial uses, or, if it chose, to license some other private consumer to make such application. Whenever the City has in the past decreased, or shall in the future decrease, the quantity of water taken by it under license from the Water Company and applied to beneficial municipal purposes, it certainly has been and will be the right of the Water Company to devote and apply that quantity to some other beneficial use.

The conclusion is inevitable that if all of the private consumers in Denver, acting simultaneously, should refuse to take out new licenses, and if the City itself should refuse longer to take under license any water from the Company's mains for application to beneficial uses, it would in such event be the Company's absolute constitutional right to devote that water to other beneficial uses to which the Company itself might apply it, or to which it might be applied by others under license, sale or other arrangement with the Company.

The Company possesses a vested property right, granted by the State and not by the City, of which it may not be deprived, either in whole or in part, simply because a certain corporation, even a municipal corporation, refuses longer to be served. Certainly the water yielded by these water rights cannot, nor can the water rights themselves be taken or used either by the City or by any of its inhabitants ,except by consent of the Water Company or upon the payment of just compensation, and after due process of law.

The conclusion is also inevitable that, under the laws of Colorado, the Water Company has something to sell or license which is wholly distinct from and in addition to the lands and structures which compose its plant. The value of this element of property is dependent upon the nature and worth of the priority of appropriation appurtenant to and inseparable from the diverting, storage and distribution plant. These are the property rights valued by the Master under the designation "Water Rights."

As is well known, the large irrigation companies make a practice of selling outright by permanent water contracts or deeds, which amount to conveyances in perpetuity, the right to receive a certain share of the water diverted under their respective appropriations and conveyed through their ditches or other works. The market value of these rights is determined not by the reproduction cost of the structures, but by the priority and consequent value of the appropriation.

As was said in Nichols vs. McIntosh, 19 Colo., 22, at 27:

> "Property rights in water consist not alone in the amount of the appropriation, but also in the *priority* of the appropriation. It often happens that the chief value of an appropriation consists in its *priority* over other appropriations from the same natural stream. Hence, to deprive a person of his priority is to deprive him of a most valuable property right."

If a company having an early appropriation had from the beginning consistently pursued the policy of merely issuing temporary licenses to consumers, and was now undertaking to sell permanent rights to those who wished to buy, would the value of such water rights be limited or in any way measured by the reproduction cost less depreciation of the structures, or the market value of the lands constituting the physical plant? Clearly not. That would be to assign to the earliest and best appropriation no greater value than that possessed by those which were later in time and subordinate in right, and perhaps not so great if the physical structures connected with the latter were more extensive and costly.

And is not this conclusive evidence of the fact that the company has something to sell or license wholly independent of its structures, and having a value dependent upon the priority of the appropriation originally perfected and since maintained by its own diversion and conveyance of the water, but by the continuous application thereof to a beneficial use, through the acts of others, under its temporary licenses? And if this be so, how could a company

which, as appellee has done, has preserved this right to itself and never permanently parted with it, be deprived thereof, except by due process of law and upon just compensation? To so hold would be, as this court has stated (233 U. S., 461), to say that while the law declared that water could be appropriated for sale, yet "it meant that there should be nothing to sell."

The water rights valued by the Master were vested property rights of the precise nature hereinabove defined. The value assigned to them was determined and measured by the current market price at which irrigation companies sold and purchasers from them dealt in rights of exactly the same kind and of similar efficiency, which conferred upon the purchaser and owner thereof the permanent right to take similar quantities of water from the irrigation ditch or reservoir and apply the same to the beneficial purpose of irrigation.

It is manifest that the present fair value of such property rights cannot be excluded from the rating base. This has been conclusively determined in a recent decision by this court, which will presently be fully considered.

San Joaquin, etc., Irr. Co. vs. Stanislaus County, 233 U. S., 454.

3. *Colorado Cases Cited by Appellants Do Not Sustain Their Contention Concerning Nature and Ownership of These Water Rights.*

In the pages which immediately precede we have reviewed in a historical way the Colorado decisions dealing with the question here involved, culminating

with the latest, which was announced in July of the present year. These, as it seems to us, conclusively demonstrate that appellants' contention is without foundation.

That contention is that, by some mysterious process, the nature of which appellants do not fully explain, and concerning which apparently they have themselves no clear conception, the property right, which by express grant the State of Colorado vested in The Denver Union Water Company and its predecessors, to divert, store, convey, deliver and apply, or cause to be applied, to beneficial uses, the waters of certain natural streams of this state, has in whole, or at least in part, passed either to the City of Denver, as a municipal corporation, or to the consumers of water therein, or to some of them, although neither the Water Company nor any of its predecessors has ever conveyed it away; but, on the contrary, has always scrupulously, and by specific written instruments, unmistakable in their terms, retained it unimpaired and undiminished.

The argument in support of this contention is fallacious, rests upon no tangible foundation, is in conflict with the long line of Colorado decisions to which we have already referred, and is violative of fundamental principles enunciated by the Constitutions of the State and the nation.

It all arises from an unfortunate expression used by Judge Helm in the early case of Wheeler vs. Northern Colorado Irrigation Co., 10 Colo., 582. That case was heard and decided by two judges only, the third, Judge Elbert, not sitting. Each of these two judges filed a separate opinion, and by a different process of reasoning arrived at the same result. The remarks

relied upon by appellants were, therefore, those of Mr. Justice Helm alone, and not of the court. They had no necessary or other apparent relation to the question at issue, and were obviously *obiter*, besides being the expressions of a single judge, and not of the court. Therefore, the famous and oft-quoted words of Chief Justice Marshall, in Cohens vs. Virginia, 6 Wheaton, 264, 399, are distinctly applicable and receive added force.

In the Wheeler case the sole question was whether The Northern Colorado Irrigation Company was engaged in a business of such a public nature that, having surplus water in its canal diverted under its appropriation in excess of that required to supply those who had, by conveyance or lease from the company, acquired the right to take water from its ditch, which surplus water was therefore available for the purpose desired, it was required to furnish the same to plaintiff for one season's use to irrigate acres lying under the canal, but upon the payment of *just compensation*. The Irrigation Company had refused to furnish the water except upon payment of $1.50 per acre for the season's use, and an additional sum of $10 per acre. The question presented was by Judge Helm deemed, for purposes of argument, analogous to that arising when an intending shipper offers goods for transportation by a common carrier and tenders therewith just compensation for the service. No one at this day questions the principle that an irrigation company organized for the purpose of supplying the public is a public service corporation, and subject to its obligations, as to that portion of its water supply yielded by its water rights and carried in its ditch which exceeds the amount necessary to supply those

who, by deed or contract with the company, are entitled thereto.

In the Wheeler case the aggregate amount per acre demanded by the company for one season's use was, as stated, $11.50. It was alleged in the petition for mandamus that this amount per acre was for one season's use unreasonable and exorbitant, as it plainly was. In the lower court the case was dismissed upon demurrer to the petition; therefore, the unreasonable and exorbitant character of the demanded charge was admitted. The company asserted that it was not a public service corporation, and therefore under no obligation to furnish water to petitioner, and consequently at liberty to impose any terms it chose. Whether this contention of the company was well founded was the only question presented to or considered by the Supreme Court. As stated above, Judge Helm alone, in the argumentative portion of his opinion, likened the business of the Irrigation Company to that of the common carrier, and in that connection used the words which are the foundation of appellants' argument. But the learned judge said (10 Colo., 588):

> "The Colorado doctrines of ownership and appropriation (as declared in the constitution, statutes and decisions) necessarily give the carrier of water an exceptional status; a status differing, in some particulars, from that of the ordinary common carrier. Certain peculiar rights are acquired in connection with the water diverted. It is unnecessary now, however, to enumerate these rights in detail."

And after remarking that the business of the irrigation company was a practical monopoly and its profits fairly guaranteed, the learned Judge further said (p. 590):

> "And an attempt to use its monopoly for the purpose of coercing compliance with unreasonable and exorbitant demands would lay the foundation for judicial interference."

Clearly the Wheeler case has no application to this controversy, nor does it decide, nor was it intended to decide, the question here presented. Clearly Judge Helm, even in his separate opinion, relied upon by appellants, recognized the fact that a vested property right (which he did not undertake to define) rested in the Irrigation Company. Clearly, he did not intend to, nor did he, hold or intimate that the Irrigation Company could be deprived of this vested property right except by due process of law and upon just compensation, or that it in any sense belonged to the ultimate consumer.

Yet, upon certain language, evidently somewhat carelessly used, in the argumentative portion of the opinion of a single judge, and not of the court, and in a case involving no such question as that here presented, appellants reach conclusions which would beyond doubt astonish the learned writer of that opinion if now presented for his consideration. Moreover, any erroneous impression which might be conveyed by these thoughtless words has been entirely removed by a long series of subsequent decisions, culminating in one announced within the last three months, all of which have been hereinbefore cited, and which set the

matter entirely at rest. Upon so slight a foundation does appellants' argument rest.

The other Colorado cases cited by appellants are readily distinguishable and utterly fail to support appellants' contention.

Thomas vs. Guiraud, 6 Colo., 530 (appellants' brief, pp. 33, 44), was a suit between two individual ditch owners, each of whom not only owned his own ditch, but also owned the entire appropriation appurtenant thereto, including the right to divert, convey and apply to a beneficial use, and each was applying the water diverted to the irrigation of his own land. Plainly the case did not and could not involve the rights of third persons, other than the owner of the ditch, to take water therefrom. No such question was considered or decided.

Farmers High Line Canal & Reservoir Co. vs. Southworth, 13 Colo., 111 (appellants' brief, p. 39), involved the rights of users of water from the same ditch as between themselves. Whether such users had, by deed or their equivalent, acquired the permanent or perpetual right to take water from said ditch, or whether they had by leases or licenses, or their equivalent, acquired merely a temporary right so to do, does not clearly appear; but from a statement in Judge Helm's opinion (p. 118) it seems evident that the High Line Company had conveyed to them perpetual rights of that character.

The company had, in a season of scarcity, when it was impossible for the company to divert from the river the full amount of its appropriation, undertaken to apportion the water pro rata among its consumers. One of these consumers brought suit to enjoin the proposed apportionment, alleging that he himself had

a priority of a certain date, and that the result of such apportionment would be to diminish the amount of water to which he was entitled under his priority for the benefit of other consumers from the ditch having priorities of a later date. The company demurred to his complaint. The trial court overruled this demurrer and granted the relief sought by the consumer. On appeal, the sole question considered was whether or not the complaint stated a cause of action, and whether or not the court below rightly overruled the demurrer. The court held that the complaint did not state a cause of action, and that the demurrer should have been sustained. The judgment was, therefore, reversed. But in this case, as in Wheeler vs. Northern Colorado Irrigation Company, *supra*, each judge filed a separate opinion and based his conclusion upon different grounds. The quotation relied upon by appellants here is from the separate opinion of Mr. Justice Helm, the same judge who wrote the separate opinion, likewise relied upon by appellants, in the Wheeler case, *supra*.

In Farmers High Line Company vs. White, 32 Colo., 114, 117, the Supreme Court, commenting on the Southworth case, said that:

> "Each of the three members of the court as then constituted wrote a separate opinion from which it would appear that no one of the learned judges was in entire accord with either of the others as to the main question discussed. That case really went off upon a question of pleading."

In the Southworth case Mr. Justice Hayt (13 Colo., 113-117) held that the demurrer should have

been sustained because the allegations of the complaint were mere legal conclusions. In the course of the opinion, however (p. 114), he stated, by way of *obiter*,

> "It seems clear that at least under some circumstances different users of water obtaining their supply through the same ditch may have different priorities of right to the water; that the appropriations do not necessarily relate to the same time."

Mr. Justice Elliott (pp. 130-139) concurred in the opinion of Mr. Justice Hayt that the demurrer should have been sustained because the allegations of the complaint were merely conclusions of law, and because the pleading was otherwise defective. In addition, but confessedly by way of *obiter*, the learned justice indicated at some length his belief that even consumers from the same ditch might have priorities of different dates. Mr. Chief Justice Helm, however (pp. 117-130), while agreeing with the other two that the demurrer ought to have been sustained, did not base his conclusion upon any technical defect in the pleading, but squarely upon the proposition that different consumers taking water from the same canal have no individual priorities; that there is but one priority, namely, that appurtenant to the diverting canal itself; and that in times of scarcity the water must be apportioned among the consumers who have the right to take it from the canal upon that basis and not otherwise. Upon this question the learned judge was clearly right and his associates clearly

wrong, as has been conclusively determined in later decisions.

> Combs vs. Farmers High Line Co., 38 Colo., 420.
>
> O'Neil vs. Fort Lyon Canal Co., 39 Colo., 487.

But the language employed *arguendo* by Mr. Justice Helm, and quoted at pages 39 and 40 of appellants' brief, was not necessary to the decision, and was a mere reiteration of what he had said in the separate opinion which he filed in the Southworth case, *supra*. Moreover, it must be borne in mind that that language was employed in a case wherein the consumers had obtained from the company, by deeds or their equivalents, permanent rights to take and use the water. It was under these conditions, and none other, that the language relied upon by appellants was used. Moreover, in the course of the opinion, the learned judge said (p. 120):

> "But the consumer himself makes no diversion from the natural stream. * * * The carrier makes a diversion both in fact and in law."

The learned judge further held that the consumer had no right, after having taken water from the irrigation ditch, to divert it directly from the stream on the priority adjudicated to the ditch, saying (p. 122):

> "But when he elects to take from the carrier's canal and thus to employ this lawful agency, he cannot reject the accompany-

> ing lawful obligations. * * * (p. 123) By virtue of its (the statute's) provisions a priority was to be awarded the carrier's canal according to the date of diversion of water thereby from the natural stream and the quantity diverted and used, but no distinct and independent priority in the consumer was in any way recognized."

And speaking of the contention, which he expressly negatived, that each consumer of water from the canal had an appropriation and a priority of his own, the learned judge further said (p. 125):

> "Besides, certain consumers will abandon the use of water from the carrier and other consumers will secure the right to the use thus abandoned."

Thus clearly indicating that when the right of any particular consumer to take water from the canal terminates, the canal company may then bestow that right upon another.

It is clearly evident, both from the nature of the question presented and determined and the character of the argument employed, even in the separate opinion relied upon by appellants, that the case last mentioned affords no support for the contention which appellants here advance. On the contrary, when rightly understood, it is distinctly an authority against them.

Combs vs. Agricultural Ditch Co., 17 Colo., 146 (appellants' brief, pp. 36, 37, 38) involved a petition for the writ of mandamus to compel the ditch com-

pany to furnish water for the irrigation of petitioner's lands. It appeared (p. 149) that the petitioner's lands were so located as to be conveniently supplied from the defendant's ditch; that he requested the defendant to supply him with water necessary for the season's irrigation; that he tendered therefor the price which had been fixed by the Board of County Commissioners (pursuant to sec. 8, Art. XVI, of the Constitution), and that the defendant refused to deliver the water. The sole defense interposed by the ditch company was that it was not a public service corporation, and therefore was not under any circumstances compellable to furnish water to petitioner unless and upon such terms as it chose. The lower court sustained this defense and dismissed the petition. It appeared that the defendant ditch company had conveyed away permanent rights to take water from its ditch, said conveyances being evidenced (as is sometimes the case, 25 Colo., 144) by so-called ditch stock, which possessed not only the usual attributes of corporate stock, but in addition expressly conferred upon the holder thereof a permanent right to take water from the ditch. However (p. 153), it did not appear that the volume of water to which said stockholders were, under their perpetual contracts, entitled, would exhaust the supply yielded by defendant's appropriation. The judgment dismissing the petition was, therefore, reversed, the Supreme Court holding that the defendant company's form of organization was such as to render it in fact a public service corporation, upon which rested the duty, as to its surplus water which it had not conveyed away, to furnish water upon proper application and for just compensation. But the court expressly says (p. 329)

that the status of such a ditch is not "in the strict legal sense of the term that of a common carrier. * * * Its status is more like that of a private carrier, whose duties are measured by the obligations it assumes towards its consumers and such as the law imposes by reason of the nature of the business in which it is engaged."

Again, we submit that the case last referred to furnishes no support for appellants' contention. On the contrary, the reasoning there employed clearly foreshadows the later decisions of the same court, which, as we have demonstrated, completely destroy appellants' contention.

Wyatt vs. Larimer & Weld Irrigation Co., 1 Colo. App., 480 (appellants' brief, p. 40) is referred to and criticized by appellants because it was later reversed by the Supreme Court; but the decision of the Court of Appeals in that case is interesting, because much that was said therein by way of argument plainly foreshadows the settled doctrine afterwards conclusively announced by the Supreme Court in later decisions. The Wyatt case was a suit brought by certain consumers upon whom, by contracts in the nature of deeds, the Irrigation Company had conferred a permanent and perpetual right to take water from its ditch. The sole question involved was as to the correct construction of the instruments of conveyance. It was claimed by plaintiffs that the terms of the conveyances under which they held were such as to entitle them absolutely to a certain volume of water, if that much was available under the ditch appropriation, and that the amount to which they were entitled could not be diminished by the necessity of pro-rating with others to whom the ditch com-

pany had made later conveyances of similar rights. It was contended by the ditch company that under the terms of said conveyances the ditch company reserved the right to make further and additional sales and conveyances up to the physical capacity of its ditch to convey, without regard to the quantity of water available under its appropriation, and that the total quantity available under its appropriation was to be distributed pro rata among all of its consumers who were holders of such conveyances, including the plaintiffs. The trial court and the Court of Appeals upheld the contention of the ditch company, the first sustaining the company's demurrer to the complaint, and the second affirming that decision (1 Colo. App., 488). The Court of Appeals, however (1 Colo. App., 489, 502), departed somewhat from the only question actually presented upon that record, and entered upon an extended discussion of the status of the ditch. This discussion is extremely interesting, especially so as the reasoning employed and the conclusions reached are almost identical with those upon which the recent decisions of the Supreme Court, cited in the preceding portion of this argument, are based.

The Court of Appeals, however (1 Colo. App., 502, 507), really based its judgment of affirmance upon the construction which it gives to the contracts between the ditch company and the consumers.

Wyatt vs. Larimer & Weld Irrigation Co., 18 Colo., 298 (appellants' brief, p. 41), is the opinion of the Supreme Court on appeal from the decision of the Court of Appeals in the case last mentioned, whereby the decision of the trial court sustaining the demurrer to the complaint and the decision of the

Court of Appeals affirming that ruling were both reversed. The opinion of the Supreme Court is, however, based expressly and exclusively upon the construction of the terms of the instruments by which the Irrigation Company had conveyed to the plaintiffs the permanent and perpetual right to take water from its ditch. The fact that any discussion of the status of the Irrigation Company would be *obiter* is expressly determined (18 Colo., pp. 307, 308). The court's observations upon that subject, quoted and relied upon by appellants, are therefore by its own express admission unnecessary to the decision, and in that sense improper. Moreover, these observations were made in respect of a situation where the original owner of the appropriation had, by deeds or their equivalents, bestowed upon others permanent and perpetual rights to take water from its canal. Certainly it does not require extended discussion to demonstrate that nothing contained in the Wyatt case affords any foundation for appellants' contention.

Wright vs. Platte Valley Irrigation Co., 27 Colo., 322 (appellants' brief, pp. 44, 51) plainly involved a situation where the Irrigation Company had, by deeds or their equivalents, conveyed to consumers permanent and perpetual rights to take water from its ditch. By the terms of these conveyances (p. 323) the right of each grantee was confined to the taking of sufficient water to irrigate certain specified lands. One of these grantees (p. 324) was attempting to take water not only to irrigate the specified lands, but also other lands owned by him. The Irrigation Company thereupon brought suit to enjoin such taking. By way of defense (p. 325) the holder of the Water Company's conveyance of such permanent and

perpetual right alleged that the additional lands which he sought to irrigate were adjacent to those described in his deed and under the Irrigation Company's ditch; that in previous seasons he had used water taken from the company's ditch for the purpose of irrigating them; that surplus water existed in the ditch available for that purpose; and that therefore he had a right as ultimate consumer to continue such use. He also alleged (p. 326) that the provisions contained in the company's conveyance of the water right limiting its use to certain specified lands was harsh, unreasonable, contrary to public policy, and therefore invalid. A demurrer to these defenses was interposed (p. 327) and by the trial court sustained. On appeal this decision was affirmed by the Supreme Court.

As is obvious, the situation there presented was one wherein the original diverter of the appropriation had, by deeds or their equivalents, conveyed to others permanent and perpetual rights to take water from its canal. For this reason the case is clearly distinguishable from that now under consideration. For this reason also it is equally clear that it cannot serve as an authority to sustain any of appellants' contentions here. As was said by the court (p. 328):

> "The only important question presented by the pleadings is whether the third provision of the contract, in so far as it limits the use of the water right in question to the necessities of the particular forty acres therein described, is valid and enforceable against appellant. In other words, whether, notwithstanding this limitation, the appel-

lant can use the water for all necessary purposes upon the land specified, and at the same time apply it to the irrigation of other and adjacent land. Counsel for appellant insist that this provision is harsh, unreasonable, against public policy and void, because it is said that the ditch company being simply a 'common carrier', is clothed merely with the right to carry water and receive compensation therefor; and the consumer under the ditch who applies the water to a beneficial use, being really the appropriator of the water, and hence the owner of the water right, is entitled to apply the water thus appropriated to any land he may desire; and any attempt on the part of the ditch company to limit or control his exercise of this right is beyond its power. We cannot agree fully with counsel upon either of these propositions. * * * Its (the company's) status is more like that of a private carrier whose duties are measured by the obligations it assumes towards its consumers and such as the law imposes by reason of the nature of the business in which it is engaged. * * * The consumer, by reason of his application of the water to a beneficial use, is said to be an appropriator, yet we do not think he occupies the exact status of one who appropriates the water directly from the public stream."

It must be remembered that these words were used in relation to a situation where the company

had conferred permanent and perpetual rights upon its consumers to take water from its canal. It must also be remembered that in the later decisions of the Colorado court cited in the preceding portion hereof, it is expressly adjudged that consumers of water from a canal or other conduit owned and operated by another are not in any sense appropriators of water from the public stream, or otherwise. And it must also be remembered that, as conclusively determined in the latest of the Colorado cases, which are hereinbefore cited, where the original diverter and appropriator has never permanently parted with the right to take and apply to a beneficial use, but has merely leased or licensed such right, the lessees or licensees obtain no right, title or interest whatsoever in the water, the water right or the appropriation thereof, save as expressly defined in the instruments under which they hold, and that upon the termination of such limited and temporary rights the entire ownership and control of the complete water right, and the whole appropriation, remain in the original diverter and appropriator, subject to sale, further lease, or other disposition by him. The late decisions just referred to are clearly foreshadowed by what was said in the Wright case, *supra.*

Appellants, at page 47, *et seq.*, of their brief set forth a somewhat lengthy excerpt from the opinion in City of Denver vs. Brown, 56 Colo., 216. This is one of the late cases cited and relied upon by us in the preceding portion of this argument. Certainly, nothing can be found in the Brown case which in any manner tends to support appellants' contention. Appellants merely quote from that opinion, and wisely do not attempt to draw any conclusion therefrom.

At page 51 of their brief they say, in reference thereto:

> "But it cannot be (and certainly is not stated in the Brown case, nor is it a fair inference to be drawn from the opinion) that in such a case" (forfeiture of consumer's right) "the Water Company acquires the right to the water; for unless the water is again applied to a beneficial use by some consumer, it must be left in the natural stream."

But appellants ignore the fact that in People, ex rel. City and County of Denver vs. District Court, decided July 2, 1917, the Supreme Court of Colorado, re-stating what it had held in the Brown case, said, among other things:

> "That while the ditch company was not the owner of the water, it nevertheless owned the right to divert the decreed appropriations awarded the ditch, and to charge a *rental* annually for its carriage, *which in effect constituted it the proprietor of the appropriations; that the ditch owner owned, controlled and possessed the right to divert the ditch's decreed appropriations;* * * * that when the consumer severs this contractual relation by not renewing the contract, the contractual obligation of the carrier with the consumer is ended, except, of course, that the consumer has an option" (by express provision of the contract) "to renew the contract within a definite time

> from year to year, and *if he fails to do so, the owner may contract the use and carriage to another.*" (Appendix B, hereto, *infra*, pp. 438, 439.)

It is significant that counsel for appellants do not in any manner refer to the case last cited, although the decision was announced before their brief was filed herein, and although the City Attorney, chief counsel for appellants here, was likewise chief counsel for the City and County of Denver in the case cited, and on its behalf contended for and obtained the conclusive judicial determinations to which we have referred.

At pages 33 and 34 of their brief appellants quote from Wiel on "Water Rights in the Western States" and from Kinney on "Irrigation and Water Rights." But these text books were written prior to the time when the Colorado doctrine upon this subject was clarified by the recent decisions, and their authors do not distinguish between the case where the consumer has by deed acquired a permanent right, and that where his right has been only temporary and conferred by lease or license (as the later Colorado cases plainly do), and therefore the statements in their text books are clearly inaccurate.

We have thus at tedious length reviewed every one of the authorities relied upon by appellants in support of their contention. We submit respectfully, but with perfect confidence, that none of them support that contention. The law in Colorado, as clearly and conclusively determined by the latest decisions of its Supreme Court is, beyond question, to the contrary.

The contention of appellants is thus stated in a nutshell at page 53 of their brief:

> "The owner of water and water rights in Colorado, then, is the *user* of the water, or, rather, the actual user of the water is the owner of the water and water rights."

Not only is this contention in direct conflict with the settled doctrine in Colorado, as conclusively determined by repeated decisions of its highest court, but its absurdity is manifest when we carry it to its logical conclusion.

If the contention be well founded, then the consumers of water under an irrigation ditch owned by some one else who had made the original appropriation might, for some reason satisfactory to themselves, —or for no reason at all,—unanimously resolve that they would divert the water yielded by the water right of which they were the beneficial owners through a new and parallel ditch which they would construct by the side of that already in existence. By carrying this resolve into effect, they would utterly destroy the investment already made in the original ditch, and, yet, if appellants' theory is correct, would be well within their rights. If this were the law, it would be cheerful news to the many who have enormous sums invested in irrigation enterprises in this State. The proposal of such a doctrine would, to say the least, not encourage further investments of that character.

Or let us apply the doctrine to the Denver situation. If it be true that the ultimate consumer is the actual beneficial owner of the water right, then who

is such owner here? Not the City, because it has been the ultimate consumer only to a limited extent and of a relatively small portion of the water yielded by these rights, and which the company has diverted, conveyed and delivered within the City to its licensees. Not the private consumers, because they have not received and applied to a beneficial use all such water, but only such portion thereof as remained after the City had taken what it desired to apply to beneficial uses, municipal in character. Can it possibly be true that the beneficial ownership is to be ratably apportioned between the City as a municipality and the many thousands of private consumers? If so, what consumers own it? This Company and its predecessors have been supplying the inhabitants of Denver for nearly half a century. The ultimate consumer may not be the same today as he of yesterday, or last month, or a year or ten years ago. Except in rare instances, he is not. What has become of the beneficial ownership, the proprietary interest, of the man who lived in a certain house in Denver fifteen or twenty years ago and took water from the Water Company's mains, but has since moved away? Did he take his proprietary interest away with him when he moved? If not, where has it rested since? And where is it now?

If this theory be correct, then, any one user of water from the Company's mains may conclude that he is tired of city residence, that he desires to move to the country, and that he will there divert, through a ditch, pipe or other conduit, the water which under his water right he has heretofore received at his city residence. Assuming appellants' theory to be correct,

no one could deny him this privilege. His right so to do would be absolute.

Or suppose that a considerable number of the present inhabitants of Denver should resolve that they preferred to live in a smaller town which they would themselves establish, and should thereupon in a body move to a new location, establish there a new town, and announce that they would at that point divert from the Platte River, through new works of their own, the water to which they were entitled under the water rights with which they were severally vested. If appellants' theory be sound, who could say them nay?

Or suppose that the City of Denver should carry out the resolve evidenced by Section 264-a of the charter, and construct a new, independent and complete system of works for the diversion and distribution of water, paralleling and duplicating those now in existence, and should then announce that it would take possession of the water rights and appropriations theretofore used and owned by the Water Company, and, by virtue thereof, divert water from the natural streams and convey and deliver it to consumers under the new municipal system, leaving the Water Company in possession of a complete waterworks system but without any water to flow through its pipes. If appellants' theory be sound, nothing could prevent the City from proceeding in exactly that way.

Incredible though it may seem, precisely that assertion concerning the City's right has been seriously made, and precisely that purpose on the part of the City has been seriously entertained and clearly

announced on numerous occasions in the course of the many attacks to which the Water Company and its property have been subjected. The fact that such a theory is now solemnly advanced and advocated by the City's legal representative is some evidence at least that the City is still animated by such a purpose.

A more effective method of confiscation could hardly be conceived. Even the engineers for the Public Utilities Commission expressly assert that no such thing could be done (see their report, Rec. p. 72) without the payment to the Company of substantial damages, including (Rec. p. 71, Fol. 90) compensation for the exclusive right of diversion, storage and carriage, which these engineers concede the Company owns.

It admits of no doubt that a theory which leads to such absurd and manifestly unjust results must be unfounded. No case has been found and, we submit, none exists, in Colorado or elsewhere, which would justify or permit it.

4. *The decision of this court in San Joaquin, etc., Irrigation Co. vs. County of Stanislaus, 233 U. S. 454, conclusively determines that water rights of the nature here involved are property rights held in private ownership, and that the valuation thereof must be included in the rating base. The fact that the case so determined arose in California affords no ground of distinction.*

In the case cited in the foregoing headline the question was whether rates of charge fixed by public authority for the service of the Irrigation Company were confiscatory and therefore unconstitutional. In order to fully understand the controversy, the opinion of the lower court must be examined with care.

In the lower court (191 Fed., 875), all of the physical property of the company was valued according to the cost of reproduction less depreciation method. But when it came to the company's water rights the lower court concluded (191 Fed., 889 *et seq.*) that their value could not be included in the rating base. In the discussion of this subject the lower court refers to and quotes the constitution and statutes of California and the decisions of its courts thereunder. It also refers (p. 894) to the early decision in Colorado to which we have already adverted, and upon which appellants rely, and quotes the unfortunate *obiter* in that opinion in support of its own conclusion. As we have already pointed out, the Colorado Supreme Court, in recent cases decided since the California case to which we now refer, clarified the situation and put the matter beyond question so far as Colorado is concerned. At this time, therefore, Colorado decisions would afford the California court no comfort or support. But upon this subject the lower court in the California case (191 Fed., 895) arrived at a conclusion which is stated as follows:

> "In these cases the theory that the irrigation company is an intermediate agency in the execution of a public trust is necessarily based upon the doctrine that the right to appropriate water is attached to the land. The company cannot at the same time be principal and agent. It cannot own the water or the right to appropriate and sell it, and at the same time be the agent of the public in appropriating it for a public use. The logical relationship of such a company to its

> appropriated water is that of agent of the owner of the land in diverting and bringing the water to the land for which it has been appropriated. But it is immaterial whether the company is deemed to be the agent of the public in diverting and carrying the water owned by the public to the consumer who owns the right to its beneficial use, or the agent of the consumer in diverting and carrying the water to his principal for a beneficial use. In either case, while the carrier is entitled to be paid for his services as a carrier a reasonable compensation under such regulations as the law may prescribe, he is not the owner of the water carried or the water right created by its diversion, and he cannot compel the consumer to purchase it, and to pay for its use, either in the way of an annual or other rate upon its supposed value as a property right."

At this point it should be noted that the California constitution and decisions lend much more support to such a conclusion than do those of Colorado. In fact, since the recent decisions in the City Ditch cases, hereinbefore cited, Colorado law furnishes no support therefor whatever. Section 1 of Article XIV of the Constitution of California provides:

> "The use of all water now appropriated, or that may hereafter be appropriated, for sale, rental or distribution, is hereby declared to be a public use, and subject to the regula-

tion and control of the state in the manner to be prescribed by law."

As we have already shown, the Colorado Constitution contains no declaration that the appropriation is for public use; but, on the contrary, both the Constitution and the statutes of Colorado contemplate and provide for the appropriation of water for sale, lease, license or other disposition, for domestic, irrigation and other purposes, without any declaration that such appropriation when made is for a public use.

When the San Joaquin case reached this court (233 U. S., 454), the determination of the trial court was reversed, and this court, speaking through Mr. Justice Holmes, announced in emphatic and unmistakable language, the doctrine which must control the case at bar, saying:

> "The bill concerns rates fixed in 1907, and the question before the court has been narrowed to a single issue. If the plaintiff is entitled to six per cent. upon its tangible property alone it is agreed that the orders must stand. But if the plaintiff has water rights that are to be taken into account, the rates fixed will fall short of giving it what it is entitled to and must be set aside. The Circuit Court dismissed the bill, 191 Fed. Rep. 875, and on this appeal figures are immaterial, the only question being whether the principle adopted is right. * * *
>
> (459) It is not disputed that the plaintiff has a right as against riparian proprietors to withdraw the water that it distributes

through its canals. *Whether the right was paid for, as the plaintiff says, or not, it has been confirmed by prescription and is now beyond attack.* It is not disputed either that if the plaintiff were the owner of riparian lands to which its water was distributed it would have a property in the water that could not be taken without compensation. But it is said that as the plaintiff appropriates this water to distribution and sale it thereby dedicates to the public use under California law and so loses its private right in the same. It appears to us that when the cases cited for this proposition are pressed to the conclusion reached in the present case they are misapplied. No doubt it is true that such an appropriation and use of the water entitles those within reach of it to demand the use of a reasonable share on payment. It well may be true that if the waters were taken for a superior use by eminent domain those whose lands were irrigated would be compensated for the loss. But even if the rate paid is not to be determined as upon a purchase of water from the plaintiff, still, at the lowest, the plaintiff has the sole right to furnish this water, the owner of the irrigated lands cannot get it except through the plaintiff's help, and it would be unjust not to take that fact into account in fixing the rates. We are not called upon to decide what the rate shall be, or even the principle by which it shall be measured. But it is proper to add a few words.

The declaration in the Constitution of 1879 that water appropriated for sale is appropriated to a public use must be taken according to its subject matter. *The use is not by the public at large, like that of the ocean for sailing, but by certain individuals for their private benefit respectively.* Thayer vs. California Development Co., 164 California, 117, 128. Fallbrook Irrigation District vs. Bradley, 164 U. S., 112, 161. The declaration therefore does not necessarily mean more than that the few within reach of the supply may demand it for a reasonable price. *The roadbed of a railroad is devoted to a public use in a stricter sense, yet the title of the railroad remains, and the use though it may be demanded, must be paid for.* In this case it is said that a part of the water was appropriated before the Constitution went into effect, and that a suit now is pending to condemn more as against a riparian proprietor, for which of course the plaintiff must pay. *It seems unreasonable to suppose that the Constitution meant that if a party instead of using the water on his own land, as he may, sees fit to distribute it to others he loses the rights that he has bought or lawfully acquired.* Recurring to the fact that in every instance only a few specified individuals get the right to a supply, and that it clearly appears from the latest statement of the Supreme Court of California, Palmer vs. Railroad Commission, January 20, 1914, 47 Cal.

> Dec., 201, that the water when appropriated is private property, *it is unreasonable to suppose that the constitutional declaration meant to compel a gift from the former owner to the users and that in dealing with water 'appropriated for sale' it meant that there should be nothing to sell."* (Italics ours.)

We respectfully submit that the decision of this court quoted above leaves nothing further to be said upon the question here presented. The water rights involved in the San Joaquin case were of exactly the same nature as those here involved, and had been acquired and were held in precisely the same manner. The constitution and statutes of California are, upon this question, of exactly the same import as those of Colorado. Indeed, as already noted, the language of the California Constitution lends more support to such a contention as appellants' than does that of the Colorado Constitution. The contention made and expressly negatived in the San Joaquin case was precisely that advanced by appellants in the case at bar.

But appellants claim (their brief, pp. 58 *et seq.*) that there is some difference between the laws of California and those of Colorado which justifies a distinction. In this appellants are clearly wrong.

They assert in this connection (their brief, pp. 58, 59) that California has never adopted the rule, which they claim prevails in Colorado, that the owner of the ditch or other diverting works does not own the water right, but that this is owned exclusively by the consumer. As we have already demonstrated, the Colorado doctrine in this respect is not that which

appellants claim it to be. Its exact nature and scope has been conclusively determined by the recent Colorado decisions hereinbefore cited and quoted from. But it does not admit of doubt that the Colorado doctrine, or one precisely like it, prevails in California.

In support of their assertion appellants again refer (their brief, p. 58) to Kinney on "Irrigation and Water Rights." But, as we have already pointed out, this valuable work was written prior to the time when the Colorado court, by its recent decisions, crystallized and clearly and conclusively enunciated the Colorado doctrine upon this subject. Consequently the Colorado doctrine, with its proper limitations, is not accurately or fully stated in the text book mentioned.

Appellants, at page 59 of their brief, mention California as one of the states in which a rule has been adopted, concerning the relation between an irrigating ditch and the consumers therefrom, differing from that in Colorado. In this appellants are clearly wrong. The rule in that respect prevailing in California is exactly the same as that which prevails in Colorado. This is evident from the fact that in the San Joaquin case, *supra*, the exclusion by the master and the lower court of the value of water rights (which decision this court reversed) was expressly based upon the proposition that the ditch company was merely a carrier, and that the title to the water rights was vested in the ultimate consumers (see 191 Fed., pp. 889, *et seq.*). His honor, Judge Morrow, in delivering the opinion of the lower court in that case, discussed this proposition at length, citing numerous authorities, including many California cases, by which, as he thought, it had been conclusively deter-

mined. He also (191 Fed., 894) cites and quotes from the Colorado cases (Wheeler vs. Northern Irr. Co., 10 Colo., 582; Wyatt vs. Larimer, 18 Colo., 298), upon which appellants here rely; and clearly holds that the California and Colorado doctrines are identical in determining that the owner of the ditch is not the owner of the water rights, but a mere carrier of the water, as agent for the consumer thereof. After reviewing these cases, including those in California, he says (p. 895):

> "In these cases the theory that the Irrigation Company is an intermediate agency in the execution of a public trust is necessarily based upon the doctrine that the right to appropriate water is attached to the land. The company cannot at the same time be principal and agent. It cannot own the water or the right to appropriate and sell it, and at the same time be the agent of the public in appropriating it for a public use. The logical relationship of such a company to its appropriated water is that of agent of the owner of the land in diverting and bringing the water to the land for which it has been appropriated."

This, beyond question, is the Colorado doctrine as contended for by appellants.

When the San Joaquin case reached this court, the same contention was advanced and the same authorities cited in its support, as is evident from the brief of appellee filed in that case (58 U. S. Sup. Ct. Repts., Law. Ed., p. 1045). Among the California

cases so cited both in the lower court and in this court were the following:

Leavitt vs. Lassen Irrig. Co., 157 Calif., 82.

Lassen Irrig. Co. vs. Long, 157 Calif., 94.

In Leavitt vs. Lassen Irrigation Co., *supra*, the Supreme Court of California said (p. 85):

> "Treating Leavitt's appropriation as being wholly and entirely for public use, he, the owner of the system, *was but an instrumentality for the distribution of the waters* which he gathered to such members of the public as might apply for them and pay to him the legal charge for the service that he rendered. As the agent of such public use, he had no power whatsoever to reserve to himself for his private purposes any part of this water. If he could reserve a part he could reserve all, and thus by his *ipsi dixit* convert a public use *into private ownership;* or if he could reserve a part for himself, he could with equal authority give away parts of the supply to others, and by this method destroy what the Constitution itself has declared shall forever remain a public use." (Italics ours.)

This, so far as the question here involved is concerned, is the exact equivalent of the Colorado doctrine as contended for by appellants.

But appellants (p. 59 of their brief) assert that in Palmer vs. Railroad Commission, 167 Calif., 163;

138 Pac., 997, cited by this court in the San Joaquin case (233 U. S., 460), something will be found which distinguishes California law from that of Colorado, and to that end insert in their brief a long quotation from the case mentioned.

The entire opinion must be read to ascertain what was determined. And such reading clearly demonstrates that the law of California, as declared in that case, is precisely the same as that of Colorado.

It is held in the Palmer case that by diversion and application to beneficial use a property right is acquired to continue to so divert and apply to such use, as against all except those having prior rights. This is the law in Colorado.

It is held in the Palmer case that if the appropriator and diverter applies the water to a beneficial use, private in its nature, such as the irrigation of his own lands, the right acquired is in all its aspects exclusively private, and neither the public nor any member thereof has any interest therein whatsoever. This also is the law in Colorado.

In the Palmer case it is held that if the appropriator and diverter, instead of applying the water diverted to a private use, devotes it to a public use, such as supplying it to a city for municipal and domestic purposes, or to the owners of lands lying under the ditch for irrigation purposes, then the right to use is owned by the public in the sense that any member of the public within reach of the service is entitled to demand and receive such use upon payment of just compensation therefor, provided there be surplus waters not needed for the supply of those

already taking such service. This also is the law in Colorado, as has been clearly demonstrated.

But it was held in the Palmer case that where members of the public within reach of the service have already availed themselves thereof to such an extent that the water rights will not yield and the conduits will not carry any more water than is needed for their supply, then other members of the public, although within reach of the service, are not entitled to demand or receive any of such water. And this also is, beyond any doubt, the law in Colorado.

These things, and these only, are determined in the Palmer case. In that case the Supreme Court of California did not attempt, except as above, to define the relationship existing between the Water Company and its consumers in cases where the water rights had been devoted to a public use, or appropriation thereof made for purposes of sale to others, nor did it in any manner undertake to decide whether in such a case the ultimate ownership of the water rights or the water afforded thereby was vested in the Water Company, or in the public, or in the consumers thereof. The language quoted by appellants (their brief, pp. 59, 60, 61) refers to the proprietary interest of a riparian owner in the waters of a stream flowing past his land. Some of the rights involved in the Palmer case were apparently of that nature; others, however, were rights acquired by appropriation, and strictly analogous to similar rights acquired in the same way under the laws of Colorado (138 Pac., 997, 998 (3)). The gist of the opinion is found in the concluding lines (138 Pac., 1001):

> "The company has not supplied or agreed to supply the plaintiffs with water for

> irrigation. The water it has, according to the findings of the commission, is necessary to supply the inhabitants of the City of San Diego,"

to which public use it was being devoted.

The Supreme Court of Colorado would have held the same thing under similar circumstances relative to appropriations made under the constitution and laws of this state, and the water yielded thereby; for in Colorado, as in California, the obligation to supply those within reach of the service exists only when the appropriator under his appropriation is able to divert water in greater quantities than may be required by those already making beneficial use of the yield of the rights; and in Colorado, as in California, whenever such surplus water exists, either because sufficient consumers have not yet been found to take the entire yield of the rights, or because former consumers have ceased to take, the company which diverts under the appropriations and carries the water so diverted to the place of use is entitled to sell, lease or otherwise dispose of the right to use such surplus water. In Colorado, as in California, this is a vested and valuable property right, includes the right to divert under the appropriations, to convey and to deliver, pursuant to sale or license, as the case may be, and is a right of which the owner may not be deprived except by due process of law and upon just compensation, and the confiscation of which is prohibited by the Federal Constitution.

This right, and this only, is the one which was valued in the case at bar.

In Colorado, as in California, it is a manifest absurdity to say (as the decisions of both states do) that the company possesses this valuable right and yet, in the face of that holding, to argue in effect (as appellants do) that the company has it not, by contending that such property right actually belongs to the ultimate user, potential or actual.

This is the thought expressed by Mr. Justice Holmes in the San Joaquin case, when, in concluding the opinion, he said (233 U. S., 460):

> "It is unreasonable to suppose that the constitutional declaration meant to compel a gift from the former owner to the users, and that in dealing with water 'appropriated for sale' it meant that there should be nothing to sell."

And when, as here, and in the City Ditch cases and in the San Joaquin case, the company has never permanently parted with any portion of these rights, but has always studiously retained them, undiminished and unimpaired, is it not obvious that it still has them for purposes of lease, sale or valuation?

The doctrine of appropriation by diversion and application to a beneficial use originated and has had its fullest development in California. True, that state still recognizes, in a modified form, the doctrine of riparian rights. Therefore, in California, there are two kinds of water rights, different in their nature, to-wit, rights by appropriation and riparian rights. Rights by appropriation as recognized and enforced in California are exactly the same in nature

and characteristics as are similar rights in Colorado. The water rights involved in the San Joaquin case were rights by appropriation. Riparian rights were in no way involved. The San Joaquin case, therefore, is on all fours with the present case so far as the question of water rights is concerned.

In Fuller vs. Swan River Placer Mining Co., 12 Colo., 12, the Supreme Court of Colorado recognized the similarity of the doctrine of appropriation as it exists in California and in Colorado, on page 16 cited numerous California cases in explanation and support of its decision relative to a Colorado water right gained by appropriation; and among others cited and quoted from Davis vs. Gale, 32 Cal., 27, wherein:

> " * * * The court, in speaking of the rights of an appropriator of water, say: 'Appropriation, use and non-use are the tests of his right; and place of use, and character of use, are not. When he has made his appropriation, he becomes entitled to the use of the quantity which he has appropriated at any place where he may choose to convey it, and for any useful and beneficial purpose to which he may choose to apply it. Any other rule would lead to endless complications and most materially impair the value of water rights and privileges."

The riparian right as recognized in California belongs solely to the owner of the land on the bank of the stream, and pertains strictly to the beneficial use of water in the stream directly upon and for the

benefit of the riparian lands so owned. It is not permissible by virtue of such right to divert water from the stream for a beneficial use elsewhere. But in California riparian rights may and frequently do exist side by side with rights by appropriation to divert for a beneficial use elsewhere, and may exist in respect to the same stream, and even in the same person, though the two rights are wholly distinct.

Vol. 1, Kinney on Irrigation & Water Rights, 2nd Ed., Secs. 508, 510, 516, 517, 519, 594, 810, et seq.

Wiel on Water Rights in Western States, 3rd Ed., p. 761.

But the doctrine of appropriation, which, as stated, exists in California side by side with the modified riparian right doctrine differs in no respect from the doctrine of appropriation as it exists in Colorado. It is dependent upon diversion and continuous application to a beneficial use, and is not confined, as is the riparian right, to a beneficial use upon or for riparian lands in the ownership of him who claims the right. In California it is assumed that the United States, as original proprietor of the public domain, was the owner of all riparian rights, and that when it permitted the diversion of waters of the natural streams and the application thereof to beneficial uses at points distant from the stream banks, it thereby waived its right as a riparian owner. In Colorado, on the other hand, the doctrine of riparian rights has never prevailed. It is assumed that the natural streams are within the jurisdiction of the state and not the national government, and there-

fore the state is deemed to be the origin of the title which supports the perfected right by appropriation. These differing theories do not affect the question here presented. The right which results is essentially the same both in California and in Colorado.

In Wiel on Water Rights in the Western States, 3d Ed., p. 227, Sec. 187, the author, after a complete discussion of the subject, concludes as follows:

> "Aside from this difference in the present derivation of the rights of the appropriator, and in the consequent attitude toward riparian rights, the substantive law of appropriation itself is much the same in those jurisdictions which confine it to the public lands as in those that do not. Its characteristics, extent of right, loss of right, and similar matters, are founded upon the early California decisions made for waters on the public domain; California being the spring from which this peculiar feature of Western law has come. The decisions of that court in the earlier days seldom failed to be quoted in the other Western States in this connection, and its early cases had everywhere a persuasive force that closely approached authority. The substantive law of appropriation is largely the same under both systems."

In California if the appropriation by diversion and application to a beneficial use be made at a time when the riparian lands are still public domain, the appropriator need concern himself only with prior

appropriations, if any, of like character to his own, for priority in time gives priority in right, both as against other appropriators and against riparian owners.

2 Kinney on Irrigation & Water Rights, 2d Ed., Secs. 631, 812, 813, 814.

If, however, at the time of the appropriation the riparian lands, or some of them, are held in private ownership, the appropriator must take into consideration an additional class of priorities, to-wit, the riparian rights appurtenant to the privately owned riparian lands.

2 Kinney on Irrigation & Water Rights, 2d Ed., Secs. 812, 815.

The rights of the appropriator by diversion and application to a beneficial use upon non-riparian lands cannot be interfered with by a riparian owner who acquired his title subsequent to the appropriation; here, as stated above, priority of time gives priority of right; and, notwithstanding prior private ownership of the riparian lands, the right of the junior appropriator by diversion and application to beneficial use cannot be interfered with, lessened or prejudiced by the senior owner of such riparian lands, unless such riparian owner can show actual damage to his senior riparian rights.

Kinney on Irrigation & Water Rights, 2d Ed., Vol. 1, Sec. 592, p. 1024; Vol. 2, Sec. 820; Vol. 3, Sec. 1611.

And even where the junior appropriator, by diverting to the full extent of his claim, inflicts a dam-

age upon the senior riparian owner in respect of his riparian right, nevertheless the right of the appropriator to divert and apply to a beneficial use upon non-riparian land may be perfected by prescription.

2 Kinney on Irrigation & Water Rights, 2d Ed., Sec. 1039.

Or, by private contract, and upon sufficient consideration, the senior riparian owner may waive his right to interfere with the junior appropriator. This was the case in San Joaquin Co. vs. Stanislaus County, 233 U. S., 454, for Mr. Justice Holmes says (p. 459):

> "It is not disputed that the plaintiff has a right, as against riparian proprietors, to withdraw the water that it distributes through its canals. Whether the right was paid for, as the plaintiff says, or not, it has been confirmed by prescription, and is now beyond attack."

This is exactly what was done in the case at bar, when the plaintiff Water Company purchased senior power rights, such as that of the Rough and Ready Mill Ditch and that of the Mullen Ditch, so that they might not interfere with its diversion under its junior appropriations.

As to the San Joaquin case, we have carefully examined not only the decisions of the Circuit Court and of the Supreme Court, but also the printed record and the briefs of counsel. It is certain that the water rights there involved were rights acquired by appropriation, diversion and application to a bene-

ficial use upon non-riparian lands far distant from the stream, and that they were not riparian rights nor derived from such rights. Moreover, the appropriations were made for purposes of sale or other like disposition of the water product, and therefore appropriated for public use by the express declaration of the California Constitution, Article XIV, Sec. 1, which reads as follows:

> "The use of all water now appropriated or that may hereafter be appropriated for sale, rental or distribution is hereby declared to be a public use."

5. *The Method of Appropriation Affords No Ground Upon Which Appellants' Contention May Be Based.*

But appellants assert (their brief, pp. 55, *et seq.*) that, at least in respect to the great reservoir known as Lake Cheesman, and the water rights appurtenant thereto, there is something in the notice of appropriation or statement of claim relating to these water rights, or in the decree by which they were finally adjudicated, which demonstrates that they are not the property of the Company, but of the City and the citizens of Denver. In this connection it must be remembered that Lake Cheesman was constructed, and is owned, and title to its water rights held, by The South Platte Canal and Reservoir Company, a separate corporation, whose articles of incorporation declare (Exhibit E, Rec., p. 904) that its objects are, among other things:

> "To construct, maintain, operate and enlarge, purchase, receive, hold, sell, grant

and convey, reservoirs, canals, tunnels, pipe lines, water pipes and water mains, for the purpose of conveying water to be used for irrigating, domestic, sanitary, fire, mining, manufacturing and mechanical purposes, and all rights, privileges and franchises belonging to, or to be acquired by, the same; to appropriate water, water rights, franchises and privileges; to sell and otherwise dispose of water and the right to the use of water for the purposes aforesaid; * * * to furnish and sell water to water-works companies, and to irrigating companies; to sell and supply the City of Denver and additions thereto, and towns and cities in the vicinity thereof, and the inhabitants thereof, and others in the vicinity, and all municipalities, and the inhabitants thereof, and all corporations and individuals along the line of its canals, ditches, pipe lines, water mains and water pipes, with water for the purposes aforesaid."

This company has never had any direct relationship with the City or the citizens of Denver, nor has it ever assumed any obligation or duty to them, contractual or otherwise. It is true that the Water Company owns all of the stock of The South Platte Canal & Reservoir Company, but it did not acquire that stock until 1899 (Rec. p. 162). The Lake Cheesman water right was initiated long before. (Rec. p. 922.) It is also true that the Water Company holds and operates all of the property of the South Platte Com-

pany, including its water rights, under lease, but that lease was not made until 1903 (Rec. p. 163, Exhibit F, not produced here). Its statement of claim and notice of appropriation relating to the water rights of Lake Cheesman referred to and quoted from by appellants (their brief, p. 56) contains other language which is pertinent, besides that quoted by appellants. It is there stated (Rec. p. 926, Exhibit S) that the Company "appropriates and claims the right to store in said reservoir all of the unappropriated and flood waters and waters flowing in the non-irrigation season; * * * and also claims the right to use such stored water for domestic purposes in the City of Denver, and along the lines of its mains and the mains of The Denver Union Water Company, *and for irrigating, sanitary, mining, manufacturing, mechanical, fire, power and storage purposes, and for all other beneficial purposes, and the right to supply and sell such waters for the purposes aforesaid.*" (Italics ours.)

A portion of the priority thus claimed related back to December 28, 1889, and the remainder to October 23, 1893; these being the dates when work upon the project and its enlargement was begun. It is perfectly evident that there is nothing in these facts, or in the language of the statement of claim, which indicates that The South Platte Canal & Reservoir Company, in making said appropriation, did so, or intended to do so, as the agent or representative of the City of Denver or its inhabitants. On the contrary, as was expressly stated, the appropriation was made for the purposes, among other things, of sale or lease of the right to use the water afforded thereby,

and obviously the appropriator did not intend that it should have nothing to sell or lease.

Appellants also refer to the decree by which the priority and extent of the appropriations of Lake Cheesman were judicially determined. Said decree was entered in 1913.

In Colorado such a decree is not essential to the validity of a water right. A water right is perfected, protected and maintained by diversion and continued application to a beneficial use. The decree provided for by the Colorado statute is merely convenient record evidence of the existence of such a right. In that respect it is analogous to a United States patent covering a mining claim. Such patent is not essential to the property right created and maintained by the location and continued assessment work thereon. Under the laws of Colorado, separate proceedings are to be had and separate decrees entered relating to uses for irrigation only, and uses for purposes other than irrigation (Rev. Stats., 1908, Secs. 3276, 3280). The decree to which appellants refer indicates merely that Lake Cheesman's right to divert and store for purposes other than irrigation has already been decreed, but that the entry of a decree covering its equivalent right to divert and store for irrigation purposes has not yet occurred.

Moreover, the decree referred to (Rec. pp. 925, 926) expressly adjudges:

> "That this decree shall not be taken, held or deemed as in any wise limiting or restricting the uses or purposes to which the waters now or hereafter diverted, stored, and

> impounded in said Lake Cheesman may be beneficially applied, or as in any wise having the effect of a waiver of or foreclosing or determining the right of said claimant, and its said lessee and their successors and assigns, and the lawful owners of said Lake Cheesman, to make beneficial application of said waters to any or all of the purposes and uses specified and enumerated in said maps and statements of claim, duly filed, as aforesaid, in the office of the Colorado State Engineer, or as in any wise barring or estopping them from asserting and maintaining such right in any other proceeding or proceedings."

And it further appears from said decree (Rec. p. 922, Fol. 1151) that as early as *January 19, 189½*, (five years before the Water Company acquired any interest therein), The South Platte Canal Reservoir Company filed in the office of the State Engineer of Colorado its map and statement of claim, relating to the Lake Cheesman right claiming the right to divert and appropriate said waters "for irrigating, domestic, sanitary, mining, manufacturing and mechanical purposes, and to supply and sell to irrigating companies and water-works companies for the purposes aforesaid;" and further claiming "the right to use said reservoir for any other purposes for which it may be utilized not inconsistent with the main purposes."

As we have already demonstrated (*supra*, p. 269), the point of diversion, the place of application, *and the character of use*, may all be changed without af-

fecting the vested property right acquired by the original appropriation and diversion.

Strickler vs. Colorado Springs, 16 Colo., 61;

Ironstone Ditch Company vs. Ashenfelter, 57 Colo., 31, 39-40.

In any event, the fact that the supplying of Denver and its inhabitants is mentioned as one of the uses for which the water is to be sold or leased, is of no significance.

In the case of the City Ditch, the act of the legislature of Kansas by which the water right was granted expressly limited the same to the right "to conduct the water so diverted to the cities of Denver, Auraria and Highlands for mechanical, agricultural, mining and city purposes" (56 Colo., 220). But it was expressly held that neither of said communities, nor any of the inhabitants thereof, acquired any proprietary interest in the appropriation by reason thereof.

The grant of this right now vested in the company was not made by the city, but by the state. The offer which the state, by its constitutional and statutory provisions, made to all who chose to accept the same, was availed of by the water company and its predecessors, who, by the necessary due diligence, and the expenditure of time, money and energy, and the accomplishment at the proper time and in the proper manner of all of the things prescribed, acquired by the state's grant this vested property right, which it has always since scrupulously maintained unimpaired. Presumably the city of Denver might have taken advantage of the state's offer and acquired the right for

itself. But it did not do so, either as a municipality or a community of residents. How can it now take away that which it did not give? How can it justly claim that that which the state granted another, and which that other has acquired at tremendous expense of money, time and energy, now belongs to it?

It cannot be doubted that these water rights possess enormous value to the company. They are an indispensable and inseparable portion of its plant. With them it is able to conduct its business, furnish water to consumers and collect reasonable tolls and charges therefor. Without them, its other property would be useless and practically have no value. If the city should condemn and take over this plant, undoubtedly, if its present theory be correct, it would continue to divert water upon, and by reason of, these same vested rights, and exact and receive reasonable tolls and charges from consumers. How can it possibly be true that this vested right is of enormous value immediately before and immediately after the taking, but at the moment of the taking possesses no value for which compensation should be paid?

A question identical in principle was considered by the Supreme Court of the United States in *Monongahela Navigation Co. vs. United States*, 148 U. S., 312, from which we have already hereinbefore made copious quotation. That was a condemnation suit brought by the United States against the Navigation Company to acquire a certain lock and dam which the navigation company had constructed in the Monongahela River. In addition to the ownership of the tangible property, the navigation company had a franchise, granted by the state of Pennsylvania, which

entitled it to take tolls for the use of this lock and dam. The lower court awarded compensation for the taking of the tangible property, but refused to allow compensation for the vested right to take tolls which the state had granted. In the Supreme Court it was argued by the United States that this grant by the state was revocable and of no force and effect as against the United States, because the river was a navigable stream and as such within the jurisdiction of the federal government, and that any grant or other action by the state could be effective only until such time as Congress and the federal government exercised their plenary power. These claims the Supreme Court sternly rejected. The opinion, by Mr. Justice Brewer, at pages 325 and 326 sets forth the governing fundamental principles, in language which we have already quoted. In respect to the claim that no compensation need be paid by the United States for the right which the state had granted, the court says (p. 337):

> "Because Congress has power to take the property, it does not follow that it may destroy the franchise without compensation. Whatever be the true value of that which it takes from the individual owner must be paid to him, before it can be said that just compensation for the property has been made. * * * So, coming to the case before us, while the power of Congress to take this property is unquestionable, yet the power to take is subject to the constitutional limitation of just compensation. * * *

And here it may be noticed that, after taking this property, the government will have the right to exact the same tolls the Navigation Company has been receiving. It would seem strange that if by asserting its right to take the property, the government could strip it largely of its value, destroying all that value which comes from the receipt of tolls, and, having taken the property at this reduced valuation, immediately possess and enjoy all the profits from the collection of the same tolls. In other words, by the contention this element of value exists before and after the taking, and disappears only during the very moment and process of taking. Surely, reasoning which leads to such a result must have some vice, at least the vice of injustice. * * *

(341) The theory of the government seems to be, that the right of the Navigation Company to have its property in the river, and the franchises given by the State to take tolls for the use thereof, are conditional only, and that whenever the government, in the exercise of its supreme power, assumes control of the river, it destroys both the right of the company to have its property there, and the franchise to take tolls. But this is a misconception. The franchise is a vested right. The State has power to grant it. It may retake it, as it may take other private property, for public uses, upon the payment of just compensation. A like, though a supe-

> rior, power exists in the national government. It may take it for public purposes, and take it even against the will of the State; but it can no more take the franchise which the State has given than it can any private property belonging to an individual."

And the court concludes its opinion (p. 344) as follows:

> "Our conclusions are, that the Navigation Company rightfully placed this lock and dam in the Monongahela River; that, with the ownership of the tangible property, legally held in that place, it has a franchise to receive tolls for its use; that *such franchise was as much a vested right of property as the ownership of the tangible property;* that the right of the national government, under its grant of power to regulate commerce, to condemn and appropriate this lock and dam belonging to the Navigation Company, is subject to the limitations imposed by the Fifth Amendment, that private property shall not be taken for public uses without just compensation; that just compensation requires payment for the franchise to take tolls, as well as for the value of the tangible property; and that the assertion by Congress of its purpose to take the property does not destroy the state franchise."

Mutatis mutandis, that case and the one at bar stand upon the same bottom. They are governed by the same principles.

In *Gardner Water Co. vs. Inhabitants of Gardner*, 185 Mass., 190, is found a case wherein the same principle is applied by the Supreme Court of Massachusetts to facts which cannot be distinguished from those in the case at bar. By a proceeding analogous to condemnation the town of Gardner had undertaken to acquire the water works system of the company. Pursuant to the statute of Massachusetts, commissioners were appointed who valued the property. One of the commissioners was Mr. Nathan Mathews, Jr., a distinguished lawyer of Boston. We have had access to the report of the commissioners, from which it appears that the total value allowed was $274,000, made up as follows: Total for physical plant, $183,000, included in which was an allowance for "Additional value of plant as a connected going concern, $18,000;" to the total of the physical value of the plant was added, for water rights, $90,000, and for street franchises $1,000. We direct attention particularly to the amount of this allowance for water rights and its relation to the total value of the plant, in view of the manifest difference which exists in respect to the quantity of available water between conditions prevailing in the Commonwealth of Massachusetts and those prevailing in Colorado. The water right so valued consisted in a right, conferred by special act of the legislature of Massachusetts upon the Gardner Water Company, to insert an intake pipe into a great pond, known as Crystal Lake, and to divert and convey the water therefrom into the town of Gardner "for the purpose of furnishing the inhabitants of Gardner with water for the extinguishment of fires and for domestic and other purposes." By the instrument of appro-

priation the company expressly declared that the appropriation was made "for the purpose of supplying the inhabitants of Gardner with pure water" (185 Mass., 191).

Against the inclusion in the award of the value assigned by the commissioners to water rights the town protested vigorously. Its contentions have a familiar ring. They are thus set forth in the reported case (185 Mass., 193):

> "That the sole source from which the company obtained water to supply the town of Gardner was a source that was *publici juris;* that the title which the State had in this lake and its waters was held in trust by the State for the public; that the public owned or was entitled to the entire beneficial use of the waters of the lake; that the power of the State was limited to regulating the public uses to which the lake might be put and in deciding between two inconsistent uses; that the provisions of St. 1882, c. 145, so far as these provisions have reference to Crystal Lake, did not operate to confer upon the company, (a) any proprietary rights whatsoever, (b) any rights in or to the lake or the waters thereof for which it was entitled to receive any sum of money whatever; that a grant by the State of rights in or to the lake or the waters thereof which entitled the company to a valuation on the basis set forth in the report would deprive the public of that beneficial use to which it is entitled; that the grant or authority contained

in St. 1882, c. 145, was conferred with an implied reservation of the public right, and that such implied reservation is inconsistent with any right on the part of the company to have the lake or its waters or any rights therein valued as a part of the corporate property or as one of its rights and privileges; that said ch. 145 was in effect a regulation and determination as to different and inconsistent rights and uses to which the company was entitled; that the provisions of said ch. 145 conferred upon the company (a) merely a loan of the waters, (b) a permission to perform the service of delivering the water to a part of the public entitled to it which the Legislature did not intend should be included in the valuation in case the town voted to purchase as authorized by sect. 9 of said ch. 145; that the rights, if any, in and to the waters of Crystal Lake, of whatsoever nature, passed to the town under the vote taken April 26, 1902, as provided in said sect. 9; that the said rights were and are public rights for which nothing can be recovered in money by the company from the town,' etc."

But the court, in no uncertain terms, rejected all of these contentions, saying (p. 194):

"The respondent in its argument relies chiefly upon the fact that the water rights granted are to use the waters of a great pond. It is true that such ponds are held by the Commonwealth for the benefit of the public,

and it is not to be presumed that the Legislature would attempt to make any disposition of their waters inconsistent with the interests of the public. In this case we have no nice question as to the power of the Legislature to grant such property to an individual solely for a private use, for the grant to the petitioner was for an important public use. Of the power of the Legislature to give to a private corporation, as well as to a city or town, water rights in a great pond, to be used in supplying inhabitants with water, there can be no doubt. This power has been exercised many times in Massachusetts. The rights and privileges of this corporation in the water, under the charter, are similar to the rights of a railroad company in the land taken for its roadbed. Such land can be taken and held only for a public use; but the corporation has a valuable right of property in it. *While the primary object in taking and holding it is the public benefit, which alone justifies a taking without the consent of the owner, an incidental object is the hope of profit to be derived by the corporation from the use of it. In this respect the title of the present petitioner in the use of the water does not differ materially from the title to the roadbed of a railroad acquired under the right of eminent domain.* The act of the Legislature in granting these water rights is simply a regulation of the public rights in a great pond. It makes subordinate all other public rights which

are inconsistent with the exercise of this one. West Roxbury v. Stoddard, 7 Allen, 158. Rockport v. Webster, 174 Mass. 385. Watuppa Reservoir Co. v. Fall River, 147 Mass. 548. Fay v. Salem & Danvers Aqueduct Co., 111 Mass. 27. Attorney General v. Revere Copper Co., 152 Mass. 444. It allows the corporation to hold and exercise these rights as a trustee for the public, and at the same time permits it to obtain income in its private capacity from the sale of the water. It makes no difference that there was no private ownership in the waters of the pond before the enactment of the statute. Land which is taken for a railroad under the right of eminent domain is not acquired and held by virtue of a transfer of the title of the former owner as private property, but by virtue of the public interest which it is taken to subserve. The valuable private interest which the railroad company afterwards has in it is incidental to the public use, but it is none the less a right of property, secured by the franchise." (Italics ours.)

It is worthy of note that in *Newburyport Water Co. vs. City of Newburyport*, 168 Mass., 541, and in *Gloucester Water Supply Co. vs. Gloucester*, 179 Mass., 365, both of which were participated in by Mr. Justice Holmes, then a member of the Supreme Court of Massachusetts, substantial awards for water rights of like character had been made. Doubtless Mr. Justice Holmes had these cases in mind when later, as a Justice of the Supreme Court of the

United States, he was called upon to decide a similar question which had arisen in a rating case.

These water rights were no more acquired in the interest or for the benefit of the community or the public, to whose use they have been devoted, than was the right of way of the Pacific railroads. This right of way, as is well known, was granted, without cost, by Act of Congress for the express and declared purpose that it be used for the benefit and accommodation of those served by the railroads. Nevertheless, it has been conclusively determined that such right of way is the property of the railroads to which it was granted, and must be included in the valuation of its entire property when rate regulation is in question.

Ames vs. Union Pacific, 64 Fed., 165, 176.
Smyth vs. Ames, 169 U. S., 466, 546.

The same thing has been held not only of the right of way granted by special Act of Congress to the Pacific railroads, but also of the right of way granted under the General Act of 1875, wherein the definition of the purpose of the grant is equally specific.

Shepard vs. Northern Pacific, 184 Fed., 803.
Minnesota Rate Cases, 230 U. S., 454.

In the Consolidated Gas case there was involved the right to lay, maintain and operate in the streets of the City of New York the necessary pipes for the distribution of gas. These had been granted by the city or the state, without cost, expressly for the bene-

fit of the consumers of gas in said city, and for no other purpose. Notwithstanding this, it was held both by the lower court (157 Fed., 875) and by this court that they must be valued and their value included in the rating base.

Wilcox vs. Consolidated Gas Co., 212 U. S., 43, 44, 52.

We submit that appellants' contentions based upon the language of the statement of claim or notice of appropriation, or the provisions of the decree, or upon the fact that the appropriator intended when he made the appropriation to utilize the same, in whole or in part, for the purpose of supplying Denver and its inhabitants with water, are totally without merit.

6. *The Evidence Before the Master Justified, If It Did Not Require, a Much Higher Valuation for the Water Rights Than That Which He Allowed.*

As we have already pointed out, the former board of appraisers valued these water rights, as of January 1, 1908, at $2,845,925 (Rec., p. 28). Between that date and the date to which the Master's valuation related, there had unquestionably been an increase in the market value of water rights, amounting to at least twenty-five per cent, and the water rights in question had been improved and enlarged (Rec., pp. 199, fol. 287; 213, fol. 303; 510, fol. 653). Taking these facts into consideration, Metcalf and Anderson, as of October 31, 1913, valued these rights at $3,530,000 (Exhibit C, p. 64). The Master, as of May 1, 1914, valued them at $2,947,617 (Rec., p. 122, Table 1, Column 4; Rec., p. 130, Finding 27).

We submit that in so reducing the value of the water rights, the Master was more than just to appellants; indeed, his conclusion in this regard, beyond question, did an injustice to appellee.

As the Master expressly states (Rec., p. 129, Findings 25 and 26), the value which he found was measured and limited by the market value of similar rights for *irrigation purposes;* but these rights were not being used for irrigation purposes, though available and valuable for that purpose. They had through a period of more than forty years been assembled, perfected and maintained as a source of supply for the water works system serving Denver and its inhabitants. They were of such character and so located as to be peculiarly available and especially well adapted for that purpose. That they possessed a higher value for the purpose for which they were being used than for irrigation purposes does not admit of doubt. All of the witnesses so testified, those for defendants as well as those for plaintiff (Rec., pp. 304, fol. 10; 307 and 308, fol. 414; 328 and 329, fol. 439; p. 362; p. 513, fol. 658; pp. 656, 657, fol. 827).

These water rights are real estate.

Davis vs. Randall, 44 Colo., 488, 492.

Therefore the determination of their value for purposes of condemnation or rating is governed by the same rules applicable to land. Those rules require that where the property in question has peculiar and special adaptability and availability for any particular use, and for that reason possesses greater value than the current market price for similar property of like kind, but not possessing such special at-

tributes, the additional value must be added and included in the valuation, or the constitution is violated.

Minnesota Rate Cases, 230 U. S., 352, 451.

Boom Co. vs. Patterson, 98 U. S., 403, 405, 407, 409.

Shoemaker vs. United States, 147 U. S., 282.

Monongahela Navigation Co. vs. United States, 148 U. S., 312, 344.

United States vs. Chandler-Dunbar Co., 229 U. S., 53, 76.

Nevertheless the Master ignored this added value, which admittedly existed, and valued upon the basis of current market price of similar rights for irrigation purposes only. But the Master's valuation, even upon the basis adopted, was unduly low.

Lake Cheesman is the enormous storage reservoir operated by the Company and located in the mountains about fifty miles from Denver. It was formed by the construction of a masonry dam across the stream-bed of the south fork of the South Platte river. This masonry dam is 221 feet in height, and at the time of its construction was, if it is not now, the largest structure of its type in this country. Photographs thereof are shown in Exhibit C following page 124. The reservoir thereby created has a surface area of 874.08 acres, and a capacity of 25,761,407,322 gallons of water (Exhibit C, p. 17). The water right appurtenant thereto is extremely valuable. It was valued by the Master for irrigation purposes at $1,611,117. It undoubtedly possesses a

much higher value as a source of city supply, the purpose for which it is now being used, and to which it is especially well adapted and available

In order to determine the value of the Lake Cheesman water right for irrigation purposes, its "safe yield" for such a purpose was reduced to "acre-feet." By "safe yield" is meant the quantity of water for irrigation purposes which could each year be with reasonable safety relied upon from this source of supply. By "acre-feet" is meant the quantity of water necessary to cover one acre of land to the depth of one foot. The determinations by plaintiff's witnesses of "safe yield," or, as it was otherwise called, "average available storage," were, as the Master found (p. 131, Finding 29), based on records of stream-flow through available data and actual observation covering a period of fourteen years. The Master states that Mr. Anderson, a witness for the plaintiff, found such average available storage to be "about 55,339 acre-feet." As a matter of fact he found it to be 57,016 acre-feet, as is shown by Exhibit A-31, Rec., p. 970. The Master also stated that Mr. Bull, a witness for defendants, found the average available storage to be 51,700 acre-feet. It appears that the Master took the average of these, for he found 54,000 acre-feet to be a reasonable estimate of the water storable in and available for delivery annually by the Cheesman reservoir. An acre-foot is equivalent to 43,560 cubic feet, or 325,855 gallons of water. The Master's finding is, therefore, equivalent to the determination that Lake Cheesman will yield each year 17,596,170,000 gallons of water. Mr. Anderson's determination was fully sustained by the

testimony of other experienced and well-qualified witnesses, who made most thorough investigations. If Mr. Anderson's determination had been accepted by the Master, instead of the mean between his and that of Mr. Bull, obviously the value allowed for the Lake Cheesman water right would have been much greater.

The Master applied (Rec., p. 130, Fol. 199) a unit price of $55 per acre-foot in determining the value of these rights. The evidence was exceedingly strong that the value of these rights, per acre-foot, measured by the current market value for irrigation purposes of similar rights, was not less than $60 per acre-foot; the testimony of many witnesses went as high as $75 (Rec., pp. 309, 245, 328, 339, 342, 344, 356, 361). These were the statements of experienced and well-informed men, who based their conclusions upon the current market prices paid for similar rights for irrigation purposes. No witness for plaintiff testified to a lower market price than $60 per acre-foot. Obviously, if the Master had applied the unit value of $60 per acre-foot, instead of $55, to the yield of Lake Cheesman, as determined by him, it would have meant an additional value for that water right of $270,000. If he had applied a larger unit price, as the evidence fully justified, and, as we think, required him to do, the resultant value would, of course, have been proportionately greater; or if he had applied the unit price determined by himself ($55 per acre-foot) to the yield as determined by Mr. Anderson, the resultant increase in the valuation would have been approximately $165,000; or if he had applied the unit price of $60 to the yield as determined by Mr. Anderson, the resultant increase would have

been such as to make the net value of the Lake Cheesman water right $2,000,000, as claimed by plaintiff (Exhibit C, p. 117).

Without going into details, the same thing is true as to Group 1 of the water rights valued by the Master at $949,500, and for which plaintiff claimed $1,150,000. The Master reduced the yield, as determined by plaintiff's witnesses and established by convincing evidence, and to the reduced quantity thus found applied the unit price of $55 per acre-foot, in spite of the strong evidence referred to above which, as we think, conclusively demonstrated a minimum current market price of $60 per acre-foot.

We submit that even the value for irrigation purposes as determined by the Master was unduly low.

But, in reality, that is not the value which these rights possess for the use to which they are now devoted. It is very much less than their present actual value for the present higher use. It is analogous to the junk or wreckage value of the company's structures. No one could properly claim that the value which ought to be assigned in this case to the Water Company's pipes and other apparatus should be the wreckage or junk value which the company could obtain therefor after it had retired from or been forced out of the water-works business.

But the Master did not take into his determination of present fair value even the entire value of the water rights for irrigation purposes as thus ascertained. After determining the market value of the water rights for irrigation purposes only, the Master deducted therefrom the reproduction cost of the

water-works structures by which these rights are developed and made useful (Rec., p. 131). The evidence shows without dispute that these water-works structures are much more elaborate and expensive than those which would be employed in the development of like water rights to a similar efficiency for irrigation purposes; even the defendants' witnesses so testified (Rec., pp. 513, 514). It follows that if any such deduction should be made at all, too large a deduction has been made here.

But we submit that in all fairness no such deductions should be made. As a matter of fact, the market price for water rights for irrigation purposes represents simply the cost of an important and indispensable part of the raw material which anyone reproducing this plant must purchase and pay for. It is analogous in every sense to the price which would have to be paid for the pipe to be put into the distribution system. When the pipe is bought, the necessary expenditures have only begun. Much more labor and much additional cost is involved in making it a part of the water-works system.

The same thing is true of irrigation water rights after they are purchased at irrigation prices. To make them available and useful for water-works purposes, much additional expenditure is necessary.

One who undertakes to reproduce this plant could not acquire the necessary water rights by original appropriation. He would be obliged to go into the market and purchase at the current market price rights already devoted to irrigation purposes. This is so, for, as all admit, the waters of the streams are overappropriated for the numerous beneficial uses to which they are applied, and it is impossible at

this date to acquire any such rights as are here needed by original appropriation. If he purchases the entire or a substantial part of the yield of an irrigation system, he must necessarily pay not only for the water rights, but also for the structures by which they are developed and made useful. Moreover, since the rights prior to his purchase are used for the irrigation of lands lying under the ditches, he must pay the damages which those lands would suffer by being deprived of their supply. This would be equivalent to practically their entire worth as irrigated lands, for without the supply of water the land would be of little value.

Not only this, but, having made his initial investment, he must incur the additional expense, suffer the long delay and risk the hazard incident to the legal proceeding for changing the point of diversion and character of use. Not only this, but rights adequate and available for city uses must be those furnishing a constant and sufficient supply at all seasons of the year. He must therefore purchase rights of this character, which are the most costly of all, or else he must undertake to convert irrigation rights, applicable only to the irrigation season, into such as would entitle him to make a continuous, uninterrupted diversion throughout the year. This would require enormous additional expenditure. But after the reproducer of this plant had done all of these things, and had, by the expenditure of the necessary time, money and effort, rendered his water rights so acquired available for use for supplying the City and County of Denver and its inhabitants, and therefore equivalent in character, adaptability and availability to those now owned by the Water Works Company,

he would have to build the necessary water-works structures. All of these things are clearly demonstrated by the testimony of plaintiff's witnesses (Rec., pp. 304, 328) and frankly conceded by defendants' witnesses (Rec., pp. 611, 612).

If, as the courts have repeatedly held, reproduction cost is a fair measure of present value; if the value of a thing which is worth having is at all indicated by what it would cost to get it, then we respectfully submit that the procedure outlined above will serve to give the court a fair idea of the present value of the water rights of the appellee company, for the uses and purposes to which they are now devoted, and for which they have peculiar availability, adaptability and fitness. We therefore respectfully submit that, instead of deducting the reproduction cost of the water-works structures from the value of the water rights arrived at, on the basis of the ruling market prices for irrigation purposes, there should in fact be added to the irrigation value so ascertained not only the cost of the water-works structures, but also all of the additional costs mentioned above, including the interest upon the necessary investment during the period of time necessary to assemble such rights and make them available for water-works purposes.

It is true that Metcalf and Anderson, in arriving at the valuation of water rights ($3,530,000) stated in Exhibit C at page 64, deducted from gross irrigation value, as determined by them, the reproduction cost of the water works structures; but the fact that they did so, merely indicates the extreme conservatism and care which pervaded their entire valuation. The Master followed the same course, but

he did so after determining a much less gross irrigation value than had been ascertained by Metcalf and Anderson. From what has been said, it must be evident that the value of water rights, as found by the Master and included in his determination of present fair value, might be greatly increased—it is not too much to say that it might be doubled—without exceeding the actual present value of the water rights here involved.

We respectfully submit that the propriety of the allowance therefor claimed by plaintiff, and stated in Exhibit C at page 64, was conclusively demonstrated by the evidence, that it was the least value which should have been assigned thereto, and that the Master in deducting therefrom approximately $600,000 committed an error.

The matters hereinbefore discussed are covered by appellee's exceptions to the Master's report (Rec., pp. 1126 to 1128; Exceptions XIX to XXVII), and by its assignment of errors (Rec., pp. 1172, 1173; Assignments 19 to 27). They are made the basis of the cross-appeal, the purposes of which have been hereinbefore explained. (*Supra*, pp. 34, *et seq.*)

VII.

GOING VALUE. THE STATUS OF BEING A GOING CONCERN IS INHERENT IN THIS PLANT AND IS, LIKE THE REST OF THE PLANT, THE PROPERTY OF APPELLEE, AND DEVOTED TO THE PUBLIC USE. ITS PRESENT FAIR VALUE CANNOT BE EXCLUDED FROM THE RATING BASE. THE MASTER'S VALUATION THEREOF WAS EXTREMELY MODERATE AND IS NOT OPEN TO QUESTION BY APPELLANTS.

The Master found (Finding 46, Rec., p. 136, *et seq.*) that there was inherent in this plant the status of being a going concern, that this was a property right of great value, and that it, like the physical elements, was owned by the proprietor of the plant. He also expressly found that, after having valued lands, water rights and personal property according to the present normal market value of similar lands, water rights and personalty, and after having added to such values the actual present-day cost of reproducing the physical structures only, less the actual accrued depreciation therein, he had failed to appraise or to include in the figure arrived at, as aforesaid, anything whatsoever on account of the value of this important item of property.

Accordingly, he valued it at $800,000 and included that sum in his total present fair value of the plant. This property right had been valued by the joint board of appraisers as of January 1, 1908, at $1,100,000 (Rec. p. 28 (c), 196, 211, 229). It was valued by Metcalf and Anderson, as of October 31,

1913, at $1,200,000 (Exhibit C, p. 64). The amount last mentioned measured the plaintiff's claim on this account.

The Master's finding mentioned above is the subject of three exceptions and three assignments of error on the part of the appellants. Exception 17th Rec. p. 1136) and Assignment XVIII (Rec. p. 1154) assert that the allowance should not have been made because the Master had "previously fully allowed the item of Interest During Construction and Engineering and Contingencies," and therefore had valued the property "as an established and assembled plant doing business and earning money." This latter assertion was made notwithstanding the fact that the Master expressly found and declared that he had done nothing of the sort.

Exception 18th (Rec. p. 1136) and Assignment XIX (p. 1154) again assert that the allowances for Engineering and Contingencies and Interest During Construction included and covered going value, although the Master had expressly found and declared that, as figured and allowed by him, they did not at all cover, include or relate to that item of property or element of value.

Exception 19th (p. 1136) and Assignment XX (p. 1154) assert that no allowance for going value should have been made because, as alleged, the Company was without a definite franchise.

It will thus be seen that no contention is open to appellants relative to the *amount* of this value as found by the Master. Appellants' contentions are confined to the *principle* which should govern its inclusion, and are coupled with the tacit admission that,

if it should be included at all, the value assigned thereto and included by the Master was not excessive.

As to the *principle* which should govern its inclusion, appellants do not question the proposition that it was rightfully included at the value found by the Master, unless (a) it had already been included in the allowances for Engineering and Contingencies and Interest During Construction (although the Master expressly found and declared that it had not), or unless (b) the fact, if it be a fact, that the Company is without a definite franchise forbids its inclusion at any value.

That the status of being a going concern exists and is inherent in such a water-works plant as this, that it possesses great value, and that it is the property of the owner of the plant, of which he may not be deprived except by due process of law and upon the payment of just compensation, has been conclusively determined.

> Omaha vs. Omaha Water Co., 218 U. S., 180, 191, 202;
>
> National Water-Works Co. vs. Kansas City (C. C. A. 8th Cir.), 62 Fed., 853, 864.

In the case last cited the opinion was by Mr. Justice Brewer, and his reasoning and conclusions were expressly approved and adopted by this court in the case first above cited.

That the status of being a going concern must be valued and the full value thereof included and given due consideration where the question concerns the

validity of rate regulation, has also been conclusively determined.

> Des Moines Gas Co. vs. City of Des Moines, 238 U. S., 153, 165.

1. *Appellants' Contention That, on Principle, This Element of Value Should Not Be Included Is Without Merit.*

The nature of this property right has never been better defined, its great value more clearly stated, nor the necessity of the inclusion of such value more strongly emphasized, than in Omaha vs. Omaha Water Co., 218 U. S., 180, cited, *supra*. That was a case of municipal purchase, analogous to a proceeding in condemnation.

The purchase was to be effected under the provisions of the ordinance pursuant to which the waterworks had been constructed and were operated, and which provided (p. 191) that "nothing shall be paid for the unexpired franchise of said company." The total valuation allowed was $6,263,295.49. Of this (p. 202) $562,712.45, or about ten per cent. of the value of the other elements, was allowed for the going value. The city objected to the allowance of this item. This court affirmed the propriety of its inclusion, saying:

> "The option to purchase excluded any value on account of unexpired franchise; but it did not limit the value to the bare bones of the plant, its physical properties, such as its lands, its machinery, its water pipes or settling reservoirs, nor to what it would take to

reproduce each of its physical features. *The value in equity and justice must include whatever is contributed by the fact of the connection of the items making a complete and operating plant. The difference between a dead plant and a live one is a real value, and is independent of any franchise to go on, or any mere good will as between such a plant and its customers.* That kind of good will, as suggested in Willcox v. Consolidated Gas Co., 212 U. S., 19, is of little or no commercial value when the business is, as here, a natural monopoly, with which the customer must deal, whether he will or not. *That there is a difference between even the cost of duplication, less depreciation, of the elements making up the water company plant, and the commercial value of the business as a going concern, is evident.* Such an allowance was upheld in National Water-works v. Kansas City, 62 Fed. Rep., 853, where the opinion was by Mr. Justice Brewer. We can add nothing to the reasoning of the learned Justice, and shall not try to. That case has been approved and followed in Gloucester Water Co. v. Gloucester, 179 Massachusetts, 365, and Norwich Gas Co. v. City of Norwich, 76 Connecticut, 565. No such question was considered in either Knoxville v. Knoxville Water Co., 212 U. S., 1, or in Willcox v. Consolidated Gas Co., 212 U. S., 19. Both cases were rate cases, and did not concern the ascertainment of value under contracts of sale." (Italics ours.)

National Waterworks Co. vs. Kansas City, 62 Fed., 853, was referred to by the Supreme Court in the foregoing case, and the reasoning of Mr. Justice Brewer expressly adopted. It has, therefore, the force and effect of an opinion of the Supreme Court itself.

The works had been built and operated under an ordinance and contract limiting the right to continue their operation to a period of twenty years, (which had expired), and expressly providing that at the expiration of said period the city should purchase the works at their then "fair and equitable value." It is important to observe that the words quoted from this ordinance and contract are exactly the same as those repeatedly used by the Supreme Court of the United States to describe the value upon which a utility is entitled to earn a fair return. The city asserted (p. 863) that at the expiration of the twenty-year period some important elements of the property had automatically passed to the city, or at least had ceased to exist. But this contention Mr. Justice Brewer negatived and sternly rebuked. Upon the subject of valuation the learned Justice said (p. 864):

> "The difficult question, however, still remains; and that is, what is 'the fair and equitable value' which, by the statute and the ordinance, the city is to pay for the waterworks? This amount was found by the circuit court to be $2,714,000. The company insists that the test is to take the income or earnings, and capitalize them. The earnings pay 6 per cent. on four millions and a half. In other words, the company has produced a property which earns 6 per cent. on four mil-

lions and a half; and that, it is claimed, is the fair valuation of the property, 6 per cent. being ordinary interest. On the other hand, the city insists that the franchise has ceased, and that basing the value upon earnings is in effect valuing a franchise which no longer exists, and which the city is not to pay for; that the true way is to take the value of the pipe, the machinery, and real estate, put together into a water-works system, as a complete structure, irrespective of any franchise, —irrespective of anything which the property earns, or may earn in the future. We are not satisfied that either method, by itself, will show that which, under all the circumstances, can be adjudged 'the fair and equitable value.' Capitalization of the earnings will not, because that implies a continuance of earnings, and a continuance of earnings rests upon a franchise to operate the water-works. The original cost of the construction cannot control, for 'original cost' and 'present value' are not equivalent terms. *Nor would the mere cost of reproducing the water-works plant be a fair test, because that does not take into account the value which flows from the established connections between the pipes and the buildings of the city.* It is obvious that the mere cost of purchasing the land, constructing the buildings, putting in the machinery, and laying the pipes in the streets —in other words, the cost of reproduction— does not give the value of the property as it

is today. A completed system of water-works, such as the Company has, without a single connection between the pipes in the streets and the buildings of the city, would be a property of much less value than that system connected, as it is, with so many buildings, and earning, in consequence thereof, the money which it does earn. *The fact that it is a system in operation, not only with a capacity to supply the city, but actually supplying many buildings in the city,—not only with a capacity to earn, but actually earning, —makes it true that 'the fair and equitable value' is something in excess of the cost of reproduction.* The fact that the company does not own the connections between the pipes in the streets and the buildings—such connections being the property of the individual property owners—does not militate against the proposition last stated, for who would care to buy, or at least give a large price for, a water-works system without a single connection between the pipes in the streets and the buildings adjacent. Such a system would be a dead structure, rather than a living and going business. The additional value created by the fact of many connections with buildings, with actual supply and actual earnings, is not represented by the mere cost of making such connections. Such connections are not compulsory, but depend upon the will of the property owners, and are secured only by efforts on the part of the

owners of the water-works, and inducements held out therefor. *The city, by this purchase, steps into possession of a water-works plant, —not merely a completed system for bringing water to the city and distributing it through pipes placed in the streets, but a system already earning a large income by virtue of having secured connections between the pipes in the streets and a multitude of private buildings. It steps into possession of a property which not only has the ability to earn, but is in fact earning. It should pay therefor not merely the value of a system which might be made to earn, but that of a system which does earn.*" (Italics ours.)

Gloucester Water Co. vs. Gloucester, 179 Mass., 365 (cited by this court in the Omaha case) was a purchase case under a statute of Massachusetts, and equivalent to condemnation. This statute provided (p. 381) that upon such purchase the city should pay the company the "fair value" of the plant, and "such value shall be estimated without enhancement on account of future earning capacity or future good will, or on account of the franchise of said Company." The commissioners (p. 372)—one of whom was Mr. John R. Freeman, a witness for plaintiff in the case at bar—allowed for the entire property the sum of $600,000, of which $75,000 was allowed on account of going value. This was objected to by the city. On this subject the court says (p. 382):

"The only doubt as to the propriety of the allowance of a sum in addition to the cost

of duplication, less depreciation, of the water company's plant is whether the principles on which the commissioners proceeded were sufficiently favorable to the water company.

It is plain that the real, commercial, market value of the property of the water company is, or may be, in fact, greater than 'the cost of duplication, less depreciation, of the different features of the physical plant.' Take, for example, a manufacturing plant: Suppose a manufacturing plant has been established for some ten years and is doing a good business and is sold as a going concern; it will sell for more on the market than a similar plant reproduced physically would sell for immediately on its completion, before it had acquired any business. National Water Works Co. v. Kansas City, 62 Fed. Rep., 853.

We think it is plain that there is nothing in the provisions of sec. 16 of the act in question, St. 1895, c. 451, forbidding the commissioners considering this element of value which, as we have seen, in fact exists. The provisions of the act are that the 'fair value * * * shall be estimated without enhancement on account of future earning capacity, or future good will, or on account of the franchise of said company.' Whether that would allow present earning capacity and present good will, apart from the franchise, to be taken into account, as distinguished from future earning capacity and

future good will, need not be considered. It is plain that the element of value, which comes from the fact that the property is sold as a going concern, in which case it has, or may have, in fact, a greater market value than the same property reproduced in its physical features, is not excluded from consideration by that provision of the statute.

It is also plain that the commissioners, in allowing the $75,000 allowed by them in addition to the cost of duplication, less depreciation, of the plant in its physical features, did not go beyond this. They state that in their opinion 'the cost of duplication, less depreciation, of the different features of the physical plant, * * * does not represent a fair valuation of this plant, welded together, not only fit and prepared to do business, but having brought that business into such a condition that there is an enhanced value created thereby, so that the city in purchasing it, without considering its income or right to do business, but having the power to carry it on on its own account, should pay more for the property as such than as if this consideration did not obtain. This is a value that we have found to be seventy-five thousand dollars ($75,000) that has been imported into the plant, which seems to us as much a part of the property valuation as any other part of it.' "

The allowance for going value was about fourteen per cent. of the total value of the other elements

of the plant. It is interesting to note that at the time of this decision, Mr. Justice Holmes was a member of the court and apparently concurred therein.

Newburyport Water Co. vs. City of Newburyport, 168 Mass., 541, was a purchase case under a statute of Massachusetts similar to that involved in the Gloucester case, and therefore in the nature of a condemnation proceeding. In this case also one of the commissioners appointed by the court was Mr. John R. Freeman, a witness in the case at bar. The statute under which the proceeding was had provided that the City should purchase the property at its "fair value," and that "such value shall be estimated without enhancement on account of future earning capacity or good will, or on account of the franchise of said company." The total fair value found by the commissioners was $275,000. Of this $40,000, or about 17% of the valuation placed upon the other elements of the plant, was allowed for going value. The matter is thus stated in the commissioners' report (p. 545):

> "We further find that the plant was a going concern and in full operation at the time of the transfer,—one that had been tested by experience and with which the city could begin the immediate prosecution of the business of supplying water to the established connections for domestic and municipal purposes (including in the latter hydrant service),—and upon examination of these facts are of opinion that the property had a greater value for the purposes of its use by the city by reason thereof, than if the

> plant had not been in full operation, and that this should be considered in passing upon the value of the entire plant. This enhancement we have fixed upon as adding to the value of the property the sum of $40,000. In passing upon the same, we have not made the income derived from the business its element or basis, or any other factor than that above stated."

This valuation was objected to by the city, but upheld by the court, the opinion being by Mr. Justice Holmes, then a member of the Massachusetts Supreme Court. The court said (p. 555):

> "The commissioners state the elements of valuation which they have taken into account. In addition to the value of the tangible property and easements, they have allowed forty thousand dollars for the fact that the plant was a going concern and in full operation. They have allowed for everything for which the petitioner was entitled to be paid. They have approached the question in a manner in which it was within their discretion to approach it. National Water Works Co. v. Kansas City, 62 Fed., 853."

In the following, among other purchase cases, going value was included, the percentage thereof to the value of the remaining elements being in each instance given where ascertainable:

> Norwich Gas & Electric Co. vs. City of Norwich, 76 Conn., 565; 57 Atl., 746, 750, 751, (11½%).

Galena Water Co. vs. City of Galena, 74 Kas., 644; 87 Pac., 735, 736 (25%).

Kennebec Water District vs. City of Waterville, 97 Maine, 185; 54 Atl., 6.

Brunswick Water District vs. Maine Water Co., 99 Maine, 371; 59 Atl., 537.

Long Branch vs. Tintern Manor Water Co., 70 N. J. Eq., 71; 62 Atl., 474, 478.

Appleton Waterworks Co. vs. Railroad Com. of Wisconsin, 154 Wis., 121; 142 N. W., 476.

It admits of no doubt that this property right and element of value exists. It cannot be better defined than was done by this court in the Omaha case and by Mr. Justice Brewer in the Kansas City case. The Master found that it existed and was inherent in this plant, and valued it at $800,000.

But appellants say (their brief, p. 64) that "the holdings have been almost uniform that 'going concern' is an element that should not be considered in determining the value of property for rate making purposes." This is a contention not open to appellants, because not raised by any of their exceptions or assignments of error. But in any event the contention is without merit.

In Des Moines Gas Co. vs. City of Des Moines, 238 U. S., 153, at 165, the court said:

> "'Going value' or 'going concern value' i. e., the value which inheres in a plant where its business is established, as distinguished from one which has yet to establish its busi-

> ness, has been the subject of much discussion in rate making cases before the courts and commissions. * * * That there is an element of value in an assembled and established plant doing business and earning money, over one not thus advanced, is self-evident. This element of value is a property right and should be considered in determining the value of the property upon which the owner has a right to make a fair return when the same is privately owned, although dedicated to public use."

The foregoing declaration is, of course, conclusive; but it is interesting to note that the principle thus declared had previously been consistently adhered to in an unruffled current of judicial authority. Below are listed some of these cases, all relating to the regulation of rates. In connection with each citation is given, where ascertainable, the amount allowed for going value measured by its relation, in percentage, to the value allowed for other elements of the plant:

> Pioneer Telephone Co. vs. Westenhaver, 29 Okla., 429; 118 Pac., 354, 359, 360. (20 per cent.)
>
> Public Service Gas Co. vs. The Board of Public Utility Commissioners, 84 N. J. Law, 463; 87 Atl., 651, 657. (30 per cent.)
>
> Public Service Gas Co. vs. Board of Public Utility Commissioners, 87 N. J. Law, 581; 92 Atl., 606 (affirming the decision last cited).

People vs. Willcox, 141 N. Y. Supp., 677, 681. (30 per cent.)

People vs. Willcox, 210 N. Y., 479; 104 N. E., 911 (affirming the decision last cited).

M. K. & T. vs. Love, 177 Fed., 493, 496.

Love vs. A. T. & S. F. Ry. Co. (C. C. A., 8th Cir.), 185 Fed., 321 (affirming the decision last cited).

Metropolitan Trust Co. vs. Houston etc. R. R. Co., 90 Fed., 683, 687.

Venner vs. Urbana Water Works Co., 174 Fed., 348, 352. (16 per cent.)

Des Moines Water Co. vs. City of Des Moines, 192 Fed., 193, 197, 198. (10 per cent.)

Bonbright v. Geary, 210 Fed., 44, 51, 54. (30 per cent.)

In the Minnesota Rate Cases the Master had deducted nothing for accrued depreciation, but, on the contrary, had added to the gross reproduction cost of the railroads large sums "for the solidification and adaptation of their respective railroads." The additional allowance in the case of the Northern Pacific was over $1,600,000, and in the case of the Great Northern over $3,200,000. These additional allowances were made by the Master on the theory that the added value attributable to "solidification and adaptation of their respective railroads" had exceeded accrued depreciation by the respective amounts men-

tioned above. In the lower court said findings of the Master were in all respects approved and confirmed.

Shepard vs. Northern Pacific, 184 Fed., 765, 810.

When the cases reached this court (Minnesota Rate Cases, 230 U. S., 352, 456) the lower court's decision upon this point was criticized only because it involved a mere assumption that the increased value due to the elements mentioned above had more than offset the actual depreciation which had accrued. This court mentioned the fact (p. 457) that the Master had found that a portion of the value offset by him against accrued depreciation had been "adaptation to the needs of the country and of the public served," "knowledge derived from experience," and "readiness to serve." This court did not at all criticize, but, on the contrary, seemingly approved the principle which justified the inclusion of these values in the rating base. It merely held that the amount of depreciation actually accrued should have been specifically determined so that it might be seen, as a matter of fact, whether such depreciation was actually more than offset by said added elements of value.

Some idea of the total amount which had been allowed for these items by the Master is gained by considering that in the case of the Northern Pacific the addition to the gross reproduction cost on account of "adaptation and solidification" was more than $1,600,000, and the depreciation in the physical property which, as the Master held, had been offset by the remaining part of these added values, had been (230 U. S., 458) estimated by the engineer of the State Commission as between $8,000,000 and

$9,000,000, making a total allowance by the Master and the lower court for these items of intangible value of from $9,600,000 to $10,000,000 out of an entire value (230 U. S., 443) of $90,000,000. This is an allowance for going value of more than 10 per cent.

From the foregoing decisions it is apparent that the allowances for going value both in rate and condemnation cases have never been less than 10 per cent. of the value of the remaining elements of the plant,—ranging from that to as much as 30 per cent. of such remaining values. It is important to observe that in the case at bar the Master's allowance for going value ($800,000) is about 6.3 per cent. of the net value ($12,615,899) of the remaining elements of the plant, and only slightly over 8 per cent. of the net value ($9,668,282) of the remaining elements of the plant, exclusive of water rights. (Rec., p. 122, Table I.)

But appellants say (their brief, pp. 64 and 65) that going value should not have been allowed to the extent that it was, because appellee (so they assert) has a monopoly of supplying a prime necessity of life, the need of which by all is emphasized in an arid region such as that where Denver is located. It is interesting to note that in this connection appellants claim that the value of appellee's property should be lessened because "it has a monopoly," whereas, in another part of their brief (p. 120), they assert that the value of appellee's plant should be lessened because it has not a monopoly but is constantly exposed to the possibility of municipal competition. Evidently appellants do not regard con-

sistency as a jewel of much worth. Of this we shall speak later.

But appellants' contention relating to going value, mentioned above, is based upon the thought that, because of the facts assumed, little cost and not much time would be required to build up the business to the level of that enjoyed by the present plant. Plainly this contention goes to the *amount* of going value allowed, as distinguished from the *principle* governing its allowance. It is therefore not open to appellants. Moreover, the contention proceeds upon the false assumption that going value as here allowed is measured exclusively by the cost of building up the business. Such is not the case. The status of being a going concern as defined in the cases hereinbefore cited, as defined by the witnesses in this case, and as defined by the Master himself in his report, includes many elements other than the mere expense and time required to get customers. Appellants say (their brief, p. 78) that the Master defined going value as "the cost of establishing the business after the plant is fully completed." This is a mistake. The Master defined it as the difference in *value*, not *cost*, between an established and going plant and one not so established and going. As to that particular element (of cost), the witnesses and Master clearly took into consideration the fact that customers might be more easily acquired in Denver than in communities where wells and other sources of supply were more numerous. The Master expressly so declared (Rec., p. 138). The witnesses so testified (Rec., p. 267, Fol. 367, pp. 290, 291). Moreover, as was said in Public Service Gas Co. vs. Board of Public

Utilities Commissioners, 84 N. J. Law, 463; 87 Atl., 651, 657:

> "The cost of a gas plant includes not merely the loss of interest while the plant is in course of construction and is building up a paying business, but *even in the case of an old established plant for the manufacture and distribution of a commodity, to the use of which the public has become so accustomed that it seems a necessity, there must be loss while pipe lines are extended to await the coming of consumers as the city extends.*" (Italics ours.)

This is conspicuously true in Denver, where the population is widespread and sparse and where, to serve them, long pipe lines must be extended which, at the beginning and for many years thereafter, obviously do not pay their way.

As was said by one of the witnesses in this case (Rec., p. 290):

> "Assuming continuity of operations, I do not believe that there ever is a time in the operations of the plant when additions to going value cease."

It seems clear that if in Omaha the going value inherent in the water plant was equal to 10 per cent. of the value of the other elements, the going value inherent in the Denver plant is at least equivalent to 6.3 per cent. of the value of the remaining elements, after making due allowance for all of the matters to which appellants refer. That percentage, as has been

demonstrated, was what was allowed by the Master in the present case.

The authorities cited by appellants (their brief, pp. 67-75) do not support their contention that going value should be entirely excluded. Those cases, so far as they have any bearing, clearly hold that such value should be included, and go merely to the extent of holding that in those particular instances it was difficult to determine that value as a separate item.

But appellants say (their brief, p. 72) that what was here valued was "good will," as defined in the Consolidated Gas Co. (157 Fed., 849, 872; 212 U. S., 19). That this is not so is clearly demonstrated by the Master's definition of what he valued, by the testimony of the witnesses to which the Master's finding related, and particularly by the decision of this court in Omaha vs. Omaha Water Co., 218 U. S., 180, 202, where the distinction is very clearly drawn, and by the other decisions hereinabove cited.

But finally appellants say (their brief, p. 73) that no going value should be allowed, because, as they assert, the company has no definite franchise. This is the only contention relating to the principle governing the inclusion of this value which is open to appellants under their exceptions and assignments of error; but this contention is plainly without merit. This is clearly demonstrated by the decision of this court in the Omaha case and the decisions of the Supreme Court of Massachusetts in the Newburyport and Gloucester cases, all of which are hereinbefore cited, wherein the governing statute or ordinance expressly required that all elements of value dependent upon franchise be excluded and wherein, neverthe-

less, going value in large amounts was included with the express approval of the courts. It is also demonstrated by the decision of Mr. Justice Brewer in the Kansas City case (cited, *supra*), expressly approved and adopted by this court in the Omaha case, wherein the franchise of the company had actually expired and it had no right to go on at all, which fact the court noticed, and wherein, nevertheless, it was held that a large allowance for going value must be made and included in the total fair value.

In this case appellee makes no claim for franchise value, notwithstanding the fact that its rights in the streets continue, although the duration thereof may be indefinite. If it had made such a claim and had demonstrated its ownership of a franchise, the value thereof must have been allowed.

> Willcox vs. Consolidated Gas Co., 212 U. S., 19, 43, 44.

The Master allowed no franchise value, and expressly so stated in his report (Rec., p. 136, Finding 42).

All of the witnesses who testified upon this subject plainly stated that the status of being a going concern existed and was inherent in this plant, notwithstanding the absence of franchise, that the valuations which they respectively placed thereon included nothing whatever for franchise value, and that said status and its value were and would be wholly unaffected by the presence or absence of a franchise (Rec., pp. 196, 205, 211, 222, 229, 234, 283).

It must be manifest that the absence of a definite franchise can have no different or other effect upon

going value than it has upon the value of any other element of the plant. Indeed, appellants expressly contend in a later portion of their brief that the present fair value of the plant ought as an entirety to be greatly reduced because of the alleged absence of a definite franchise, and also because of the possibility of municipal competition. This matter will be further noticed when we reply to that contention (*infra*, pp. 409 *et seq.*).

We have now discussed every contention of appellants relating to the propriety of the principle of inclusion of going value, although, upon this record, appellants are foreclosed as to most of them. We respectfully submit that all of such contentions are without merit.

2. *Appellants' Contention that the Allowances for Engineering, Contingencies and Interest During Construction Included also an Allowance for Going Value, is Contrary to the Master's Express Finding, in Conflict with the Record, and Wholly Untenable.*

Appellants assert (their brief, pp. 72, *et seq.*) that any valuation of the other elements of appellee's plant in excess of their "scrap value" necessarily includes going value, and that where, as here, present value of the structures has been determined by the reproduction-cost-less-depreciation method, and allowances have been made for Engineering and Contingencies and Interest During Construction, as part of such reproduction cost, such allowances necessarily include going value, and the plant has necessarily been valued as "an assembled and established plant doing business and earning money," as distinguished

from one "not thus advanced." "Scrap value," sometimes otherwise referred to as "junk value," or "wreckage value," means the amount of money which the owner of a plant can realize therefrom when, after retiring from the business for which the plant was constructed and in which it has been engaged, he sells the materials composing the plant to junk dealers and others, to be removed and applied to other uses. To say that such a value measures the present fair value of the plant, even exclusive of going value, is monstrously absurd. It is equivalent to the assertion that the value of a house is measured by what the owner would receive if he tore it down and sold the bricks, stones and lumber as second-hand material.

No case concerning either rates or condemnation can be found in which either fair value or just compensation is measured in any such way as that suggested. All are to the contrary. The assertion that any allowance in excess of scrap value includes going value, flies in the face of the many authorities hereinbefore cited where, in rate and condemnation cases alike, the value of lands has been determined according to their current market value, the value of structures has been determined by the reproduction-cost-less-depreciation method, and in addition thereto large allowances have been made for the element of going value.

Moreover, appellants' assertion that, because the Master, in determining gross reproduction cost of structures, included in such cost allowances for Engineering and Contingencies and Interesting During Construction, therefore and thereby he necessarily included and covered the value of the status of being a going concern, is in direct conflict with the Master's

express finding and declaration; for the Master expressly found and declared (Rec., p. 135, Finding 41) that his allowance for Interest During Construction covered only "interest on the money necessarily expended *in the construction of the plant from the time the work is commenced until the plant begins to earn an income;*" and expressly found and declared (Rec., p. 136, Finding 44) that his allowance for Engineering and Contingencies was "twelve and one-half per cent. *of the estimated fair cost of reproducing the structures;*" and in Table 1, Column 2 (Rec., p. 122) included it in, and stated it as being part of, the gross reproduction cost of the structures only. And when he came to the question of going value (Finding 46, p. 137) his finding and declaration upon this subject are so positive and distinct as to place the matter beyond the possibility of doubt; the language is: "Has this element of value (going value) been considered and appraised in the valuation found for the physical property (including water rights) of the Company in the preceding pages of this report? Such valuation of the physical property represents and is intended to represent the present market value of the company's lands (Class A), water rights (Class B) and personal property (Class T), *with no addition whatsoever because such property constitutes part of a long-established plant doing a business which yields an income.* The valuation of the other classes of the property is intended to represent its present value determined by its estimated reproduction cost (new), less its actual accrued depreciation, *with nothing added because the property is a part of 'an assembled and established plant doing business and earning money.'* Such valuation of the entire

property has been made precisely as if the plant were about to commence serving the public with its business yet to be established. *The plant is one 'where its business is established' and is 'an assembled and established plant doing business and earning money.' It follows that the 'element of value'—the 'property right'—going concern value remains to be appraised.*" (Italics ours.)

These findings and declarations of the Master are not excepted to nor made the subject of any assignment of error. They are unquestioned and unquestionable. They are based upon the Master's personal knowledge of the processes by which he had arrived at the various figures thereinbefore set forth in his report. There can be no better evidence than this. How, then, can appellants with good conscience assert, as they do (their brief, p. 78) that "in the present case the Master, as we view it, has made an allowance for overhead charges which is more than enough to take care of any so-called 'going concern' " ? Moreover, all of the witnesses who testified in this case concerning allowances for Engineering and Contingencies and Interest During Construction scrupulously confined them to the period of construction which elapsed prior to the time when that element of the plant to which they related went into service (Rec. pp. 203, 208, 228, 265, 267, 277, 285, 298, 890-892, 893; Ex. A19, sheet 7, Rec. p. 958 (1192); Ex. A103, Rec. p. 1067 *et seq.*), and those who testified concerning going value, in so far as it had any relation to the cost of establishing the business, scrupulously confined such cost to the period which would elapse after construction work was fully completed, and upon the assumption that each element of the plant would go into serv-

ice as soon as finished. (Rec. pp. 266, 267, 277, 290, 291, 893 (f. 1108); Ex. A19, Rec. p. 958 (f. 1191, 1192.)) It does not admit of any doubt that there was no possibility of overlap between the allowances testified to by the witnesses and made by the Master for Engineering and Contingencies and Interest During Construction, and the allowance, so testified to and so made, for going value.

Appellants in this connection rely upon the decision in Des Moines Gas Co. vs. the City of Des Moines, 238 U. S., 153, but this decision, instead of supporting their contention, destroys it. In the case cited this court, after (p. 165) distinctly holding that going value must be included, said:

> "Each case must be controlled by its own circumstances, and the actual question here is: In view of the facts found and the method of valuation used by him, did the Master sufficiently include this element in determining the value of the property of this company for rate-making purposes?"

This question was considered and answered in view (p. 163) of the guiding rule concerning burden of proof laid down in Knoxville vs. Knoxville Water Co., 212 U. S., 1, and applicable to cases where the rates have been prescribed by a valid ordinance. As we have already demonstrated, this is not such a case *(supra*, p. 56 *et seq.*).

In the Des Moines case the Master and the court below both had held that the ordinance rates were not confiscatory. As the case was presented to this court, it was therefore necessary for the company

to overcome not only the strong presumption of validity attendant upon rates established by an ordinance otherwise valid, but also the strong presumption of correctness attendant upon findings and conclusions of a Master and a trial court, the reversal of which is sought. Exactly the opposite situation is here presented.

In the Des Moines case it appeared (p. 166) that the Master had added for overhead costs, including Engineering, Contingencies, Interest During Construction, Organization Expenses and other items which he did not very clearly specify, the sum of $303,177, where the gross reproduction cost of the entire property, without overhead costs and exclusive of lands, was (p. 162) $1,975,026. There was no finding that these allowances for overhead costs covered only the period of construction. On the contrary, the Master's finding indicated that they covered the whole elapsed period between the beginning of construction and the date when the plant became fully established, in successful operation, with its business attached. Quite the contrary is true here, as has already been shown.

In the Des Moines case (p. 170) the Master expressly found and declared that he had valued the plant as one "in successful operation." Here, as we have shown, the Master expressly found and declared that until he included his allowance for going value he had not so valued the plant.

In the Des Moines case (p. 170) the Master expressly found and declared that the total value which he had assigned included an allowance, which he deemed sufficient, for the status of the plant as a

going concern. In the case at bar, as we have shown, the Master expressly found and declared to the contrary.

Under the circumstances which we have recited, and in view of the strong presumptions to which we have referred, which support the validity of rates prescribed by an ordinance otherwise valid, and which also support the propriety and correctness of the findings and conclusions of a Master and of the court below, this court, in the Des Moines case, affirmed the decree. In concluding upon this subject, the court said (p. 171):

> "While there is a difference between court and counsel as to what the Master meant by this, we think it is apparent that he meant to say that, applying the rule of the Cedar Rapids case, he had already valued the property in the estimate of what he called its physical value upon the basis of a plant in actual and successful operation; for he said that otherwise its value would be much less. * * * When, as here, a long-established and successful plant of this character is valued for rate making purposes, and the value of the property fixed, as the Master certifies, upon the basis of a plant in successful operation, and overhead charges have been allowed for the items and in the sums already stated, it cannot be said, in view of the facts in this case, that the element of going value has not been given the consideration it deserves, and the appellants' contention in this behalf is not sustained."

In short, this court in the Des Moines case did not hold, nor did it intend to hold, that going value should not be included in a rate case. On the contrary, its holding was directly otherwise.

And this court in the Des Moines case did not hold, or intend to hold, that going value should be excluded merely because Engineering, Contingencies, Interest During Construction and other overhead costs had been allowed. Its ruling in that regard was that no *separate* allowance for going value need be made when it appeared that, without such separate allowance, the plant had actually been valued as one in successful operation, and when it also appeared that, in addition to the market value of the lands and the actual cost of the structures, large allowances had been made for indefinite items, apparently not confined to costs incurred merely during the period of construction.

And this court in the Des Moines case affirmed the decree because appellant had not sustained the burden of showing that the Master and the court below did not give due consideration to the element of going value, just as in the case at bar the court must affirm this decree because the appellants have not sustained, and cannot sustain, the burden of showing that, if the specific allowance made by the master for going value be excluded, the valuation which remains includes the fair present value of the status of being a going concern.

3. *The Evidence Not Only Justified But Required a Larger Allowance for Going Value Than That Made by the Master.*

The master's allowance for going value was, as stated, $800,000. The joint board of appraisers valued this property right, as of January 1, 1908, at $1,100,000 (Rec. pp. 196, 211, 229), and defined it as (Rec. p. 28) "the added value of the plant because of its connections and business, and because the parts are united into one system and are tested and in successful use." This allowance represents the united judgment of five distinguished engineers, whose qualifications are beyond dispute. So far as appellants are concerned, it amounts, we submit, to an agreed valuation below which they cannot be permitted to go. This will be further noticed later on.

Mr. Freeman states (Rec. p. 196, Fol. 284) that this value was "entirely independent of any business and franchise value," and that it was not based upon "the expense of developing the business," and that (Rec. p. 205, Fol. 294) he based his recent determination of the amount of going value, which was the same as his former one, upon the same elements as in 1908, "regardless of the fact that the City is about to begin construction of its own plant. I believe that the value is there if the City chose to avail itself of it."

Mr. Holman said (Rec. pp. 211, 213) that going value "is the value found in a live plant, over and above the value of a non-operating plant of similar physical characteristics," and assigned a value to it as of May 1, 1914, of not less than $1,154,788. At page 222, folio 314, he defined it further and in much the same way, adding "a concern may have a large going

value, though its gross earnings are such that it is losing money."

Mr. Hazen (Rec. p. 229, Fol. 322) in his testimony assigned to it the same value ($1,100,000) as that which the joint board of appraisers had given it, and defined the property right as follows: "It represents the difference in value between this plant as it is and a plant identical with it as to physical structures, but without the business or connections and not in operation. Going value is the same, with or without a franchise. It has been called 'cost of developing business' and that definition has a good deal of merit. I should not consider it altogether cost, although it is largely a cost item;" and (Rec. p. 234, Fol. 328) "going value is an element of real value. It is also to a large extent an element of cost, and as an item of cost it seems to me that it is a part of the capital that must fairly be taken into account in discussing fair rates. It is an element that grows out of the real conditions of the business and adds both to the value of the property and to the rates that are fair. Going value is an element of value that stays with the plant all the time."

Metcalf and Anderson determined the going value to be, as of October 31, 1913, $1,200,000 (Exhibit C, p. 64). Mr. Metcalf explained this allowance fully and conclusively justified its amount not only by oral testimony but also by a number of elaborate and convincing exhibits (Rec. 265 to 267, 283, 290, 291, 894-896; Exhibits A-19, Rec. p. 958; A-104, Rec. p. 1075). Mr. Metcalf demonstrated very clearly the necessity and propriety of an allowance in the amount stated in Exhibit C, showed plainly that it was not and could

not be affected by the presence or absence of a franchise, proved conclusively that there was no possible overlap between such an allowance and the allowances for Engineering and Contingencies and Interest During Construction, and, among other things, said (Rec. p. 267, Fol. 367):

> "As a result of these studies in this region, where I believe the rate of acquisition of the business would be more rapid than normally found in this country, I have assumed the going value of this property to be $1,200,000. I believe that the actual development expense in this plant has been substantially more than that." * * * (Rec., p. 283, fol. 386) "I took into consideration in arriving at both the going value and the general value the fact that the company's franchise had expired."
>
> (Record, p. 290) "Assuming continuity of operations I do not believe that there ever is a time in the operations of the plant when additions to going value cease. * * * The cost of educating the public to the advantage of water under pressure is not the sole element of expense involved in the development expense or going concern. The development expense is made up very largely of the burden of interest charges, the carrying of the plant to a point where the earnings of the plant will carry it."

The witnesses mentioned above were the only ones who testified upon the question of going value, or the amount thereof inherent in this plant. The

Master in his finding refers to their testimony (Rec., p. 137, fol. 211) and also mentions Mr. Van Diest as one who had estimated "development expense at about $375,628."

The truth is, as the record clearly demonstrates, that the Public Utilities' engineers included nothing whatever in their determination of values on account of going value. The value of this item, like that of water rights, was entirely omitted. This is true, although they admitted that going value, in the sense in which it was defined and allowed by plaintiff's witnesses, should be allowed and included in the valuation. Their original report did contain an item called "development expense," in the amount stated by the Master, but this was the result of figuring the deficits in actual net income (compared with what it should have been) accruing from the actual operations of the company during the twenty years of its life, upon what was asserted to be, but was not in fact, the formula of the Wisconsin Railroad Commission, and upon assumptions as to value and other basic facts which were unjust to the company. All this clearly appears from the cross-examination of Mr. Van Diest (Rec., pp. 414, 427-430; Exhibit A-64, not produced here).

In Mr. Metcalf's testimony and exhibits, the injustice of the assumptions and the impropriety of the method adopted by the Public Utilities' engineers in figuring so-called development expense was clearly demonstrated; and it was shown, that even upon those assumptions, if the formula of the Wisconsin Railroad Commission had been actually followed, it would have resulted in a development expense of at

least $1,710,000, and probably much more (Rec., p. 958).

But the actual fact is that the item "development expense" embraced in the report of these engineers did not really cover anything whatever in the nature of going value. It was simply made use of as a "catch-all" for various items of actual construction cost, which these engineers had by inadvertence omitted, as distinguished from going value or development expense, and the sum of these omitted items of actual construction cost greatly exceeded the total of the allowance for so-called development expense. This is clearly demonstrated in the cross-examination of Mr. Van Diest (Rec., p. 427, fol. 556; p. 440, fol. 572; p. 421, fol. 549). It therefore admits of no doubt that there actually was no allowance whatsoever by the Public Utilities' engineers for going value, development expense, or anything analogous thereto, although they frankly admitted that such value existed and should have been included. It follows that the Master's allowance ($800,000) is less by $300,000 or $400,000 than it should have been under any view of the testimony. Upon this point there was no conflict in the evidence; it was all one way.

In the case at bar the Master's allowance for going value ($800,000) is about 6.3 per cent. of the net value ($12,615,899.00) of the remaining elements of the plant; about 5½ per cent of their gross value before deduction of depreciation; only slightly over 8 per cent. of the net value ($9,668,282.00) of the remaining elements of the plant exclusive of water rights, and about 7 per cent. of the gross value of said remaining elements before deduction of deprecia-

tion. (Record, p. 122, Table 1.) The authorities cited in the preceding pages demonstrate that the minimum allowance has been 10 per cent., ranging from that to as much as 30 per cent. The testimony of the witnesses in this case was to the same effect.

To say the least the allowance for going value made by the Master did appellants no injustice. Indeed, it was more than just to them, and so low as to be, under the undisputed evidence in this case, unjust to appellee. We respectfully submit that the value claimed by the plaintiff for this item ($1,200,000.00) was amply sustained by undisputed evidence. This the Master himself observes (Record, pp. 137, 138); nevertheless, he discounts that claim by $400,000.00, although, confessedly, there is no evidence justifying the reduction.

This presents purely a question of law and not one of fact relating to a finding based upon conflicting evidence. The contention is covered by Exception XXXVIII (Record, p. 1131) and by Assignment of Error 38 (Record, p. 1175) upon which the cross-appeal is based. This exception and assignment of error were filed and the cross-appeal taken for the reason, with the purpose, and under the conditions and limitations hereinbefore fully explained. (*Supra*, p. 34, *et seq.*)

VIII.

COMPANY'S OVERHEAD COSTS, INCLUDING ENGINEERING AND CONTINGENCIES AND INTEREST DURING CONSTRUCTION MUST INEVITABLY BE INCURRED IN THE REPRODUCTION OF THE PLANT. THEY CANNOT BE EXCLUDED FROM DETERMINATION OF REPRODUCTION COST, WHICH IS A MEASURE OF PRESENT FAIR VALUE. THE MASTER'S ALLOWANCES THEREFOR WERE EXTREMELY MODERATE AND ARE NOT OPEN TO QUESTION BY APPELLANTS.

The principal and, it is fair to say, the only real contention made by appellants respecting overhead charges and Interest During Construction is that the allowances therefor necessarily included an allowance for going value, and that therefore the separate allowance for going value made by the Master constituted a duplication of values. This contention has already been fully discussed and is, we submit, without merit (*supra*, pp. 366 *et seq.*).

Eliminating said contention, apparently nothing is left concerning these allowances which even appellants consider worthy of discussion.

Their treatment of the subject mentioned in the foregoing headline appears on pages 79 to 82 of their brief, is practically devoid of the citation of authorities, contains no references to the record, and is in every respect so casual and slight as to justify the assertion that all contentions concerning overhead charges and Interest During Construction are aban-

doned except that relating to duplication of values, which is hereinabove specifically mentioned.

Appellants' exceptions and assignments of error relating to these matters are in substance as follows: Exception 2nd (Rec., p. 1132) and Assignment III (Rec., p. 1148) assert that "The Master ought to have used the fair contract cost, new, of the said property and plant, instead of the gross reproduction cost, less accrued depreciation, in determining the present reasonable value."

Exception 18th (Rec., p. 1136) and Assignment XIX (Rec., p. 1154) assert that Engineering and Contingencies and Interest During Construction "are what are commonly known as overhead charges, and go to make up the item of 'going concern value,'" wherefore, the latter should not have been allowed as a separate item.

Exception 16th (Rec., p. 1135) and Assignment XVII (Rec., p. 1153) relate only to the allowance for Interest During Construction, and assert that no such allowance should be made "if there is to be allowed also the item of 'going concern' value, and because the plant of complainant company was not constructed as a new and complete plant, in the construction of which Interest During Construction might be an item for consideration, but was a plant constructed piecemeal and from time to time, and, except for a very inconsiderable portion thereof, has been constructed out of income and with money derived through the payment of water rates in advance."

From a consideration of the foregoing exceptions and assignments, it is manifest that the possible contentions open to appellants are very limited both in number and in scope. Aside from the contention,

which has been already disposed of, relating to the alleged duplication of values, appellants are at the most limited to the following points: (a) That where fair contract cost is the basic figure, the Company's overhead costs and Interest During Construction should not be added *nor* (it seems) *accrued depreciation deducted;* (b) that as to Interest During Construction (but not as to Engineering and Contingencies) it should not be allowed, because the existing plant was actually constructed in a piecemeal manner.

No contention is open to appellants and none is made concerning the *amount* allowed by the Master for any of these items. The *amount* of these allowances is dependent upon findings of fact made by the Master which are unquestioned and unquestionable. If on *principle* such allowances are proper, then, so far as appellants' contentions are concerned, said allowances in the amounts found by the Master should stand. So far as the question of *principle* is concerned, this depends, as we submit, upon the necessity of such costs in the reproduction of this plant, and therefore upon a question of fact which the Master found against appellants. This finding of fact also is unquestioned and unquestionable, and therefore appellants are foreclosed not only as to the amount of the allowances, but also as to the principle which justifies their inclusion.

Appellants (their brief, pp. 79, 81) intimate rather than assert that because reproduction cost was determined upon the assumption that the work of producing the structures would be done under contract, therefore these allowances should not be made. But this was the assumption

made by every witness who testified before the Master, those for defendants as well as those for plaintiff, and every one of them added allowances for the Company's Engineering, Contingencies and Interest During Construction to what was deemed fair contract cost. It is a fact, so obvious and well known that the court will take judicial notice thereof, that work of this character, conducted on a large scale, can be done more cheaply by experienced and well equipped contracting firms than by the owner on his own account. In practice, such work is invariably so done. It is equally obvious that, though the actual construction work be done under contract, the owner must necessarily incur great expense in addition to the mere contract cost of structures.

The Master's allowances for these items covered all of the Company's costs of construction in excess of the contract price, and included preliminary expenses and organization (Rec., p. 136, Finding 42); engineering, including exploration work and detailed surveys in the field necessary before the plant could be located, and plans and specifications for its construction prepared; and including also the preparation of such plans and specifications, the submission thereof to bids and the letting of contracts; the subsequent superintendence by the Company while the work was in progress; the testing of materials and the like; and examination of the work from time to time and at its conclusion to see that it progressed according to the contract and the plans and specifications; all costs of administration and the maintenance of a company organization; all costs involved in the acquisition, assembling and subsequent main-

tenance, during the period of construction, of the lands and water rights—all of which necessarily would require a large organization—and also interest upon all of the sums of money invested during the period of construction and until the plant began to operate. All these things and others of like kind the Company must do at its own cost.

Appellants say that if the plant is constructed under contract, interest during construction would not accrue, because, presumably, the contract price would not be paid until the plant was complete. But, as is obvious, the contract or contracts would relate only to the structures. The heavy investment necessary for the acquisition of the lands would have to be made at the very beginning and before the contractor began to put the structures thereon. But as to the contract itself, appellants are clearly mistaken. The structures which compose this plant are massive in character and great in extent; several years would necessarily be required for their reproduction; this all witnesses admitted, and the average period assumed was about five years. Obviously, no contractor would take a contract which required him to raise and invest the vast sum necessary for construction, and receive no payment on his contract until the construction work was fully complete. Therefore, all witnesses assumed, as was obviously necessary, that the contract price would be paid in installments and from time to time as the work progressed. It is too clear for argument that interest during construction would necessarily be incurred in large amounts because of payments on the contract price required to be made long before the structures went into service.

As to the assumption that the structures of the plant would be reproduced under contract, not only did all of appellants' witnesses proceed upon this assumption, but appellants themselves appeared to be entirely satisfied therewith. Their Exception 2d and Assignment III (Rec., pp. 1132 and 1148) expressly assert that the Master "ought to have used the fair contract cost, *new*, * * * instead of the gross reproduction cost, less accrued depreciation." This language is somewhat cryptic, but if appellants mean what they clearly appear to say, they should be satisfied, because the Master's determination of fair contract cost, new, of the structures, without any addition for engineering and contingencies, was $8,370,078 (Rec., p. 122, Table 1, Col. 2), whereas his determination of the present value thereof, arrived at by adding the overheads and deducting accrued depreciation, was $8,216,237 (Rec., p. 122, Table 1, Col. 4). The latter and lesser figure was the one taken into his total present fair value of the plant.

As to the assertion by appellants that the allowances for Engineering and Contingencies and Interest During Construction should be affected by the consideration that the existing plant was actually constructed by piecemeal, and not as an entirety under one contract, or series of contracts, executed as rapidly as possible, the obvious answer occurs that this relates to the *amount* of the allowances rather than to the *principle* of their inclusion. As we have already pointed out, all questions concerning amount are foreclosed.

Moreover, this contention relating to piecemeal construction of the existing plant has to do with ac-

tual original cost, as distinguished from present value. As we have already demonstrated, present value, measured by present-day reproduction cost and not actual original cost, is the test (*supra*, pp. 189 *et seq.*, 207 *et seq.*).

But it does not admit of doubt, and this record demonstrates, that piecemeal construction is, in any event, more expensive than continuous construction on a large scale; the testimony before the Master showed this without dispute (Abstract, p. 278; original transcript 4 C., pp. 1823, *et seq.*). The original testimony is more extensive, distinct and emphatic than the abstract thereof. Moreover, the fact that piecemeal construction involves greater cost has many times been the subject of express adjudication and is well recognized.

> Whitten on Valuation of Public Service Corporations, Vol. 1, Secs. 360-362.

Appellants assert that upon the assumptions made by the Master and the witnesses, the Company "has to complete its whole plant before it commences to earn money." But in this appellants are mistaken. The assumptions were that, as rapidly as portions of the plant were completed, they went into service and continued to serve while construction work progressed upon the remainder. Thereby Interest During Construction and Engineering and Contingencies were lessened and going value in the sense of development expense was likewise lessened.

In fact, every assumption made was of a character which would reduce the cost and consequent valuation, and therefore favored appellants.

But appellants assert that inasmuch as the plant has actually been produced piecemeal, and while the Company was actually engaged in operating that portion of its plant already completed, therefore the work would be done and supervised by an organization already formed, and the cost thereof would be charged "as operating expenses." In this appellants are clearly mistaken. As we have already demonstrated (*supra*, pp. 143, 152, *et seq.*), the operating expenses, by consideration of which the Master determined net earnings, contained no item attributable to construction. In so far as concerns reproduction cost or present value, it is certainly a matter of no significance where the money actually came from or how it was charged.

Appellants cite Cumberland Tel. & Tel. Co. vs. City of Louisville, 187 Fed. 637, and from it draw the conclusion that overhead charges are too intangible to justify their allowance. No such thing was held in the case cited. There the Master had found a value which was sufficiently large to require a decree adjudging the rate in question confiscatory. Whether such valuation might not properly have been larger was, of course, moot. The court, therefore, gave scant attention to the company's exception which asserted that the Master's allowance for overheads had been inadequate.

Appellants (their brief, p. 82) refer again to Des Moines Gas Co. vs. Des Moines, 238 U. S. 153, and from this court's opinion therein draw the conclusion that because overhead charges were allowed, therefore going value should not be. This contention has already been discussed and its futility demonstrated. (*Supra*, pp. 366 *et seq.*)

Appellants also assert that in the Des Moines case the total allowance for overhead charges amounted to about 15 per cent. If, as a matter of computation, this be correct, it is of no significance. The determination of amount involves a question of fact, and each case presents different facts. Doubtless, in the Des Moines case, the plant was of such a nature that the period of construction was much shorter and the difficulties to overcome much less than in the Denver case.

Appellants assume that in the Des Moines case the allowance for overhead costs included and covered the total allowance for going value. This is a mistake. As we have already shown, the plant was, in the Des Moines case, valued as one "in successful operation." Plainly this element of value was not entirely, although it may have been partially, covered by the allowance for overhead costs.

Without going into details, it is sufficient to say that the evidence in the case at bar more than justified the allowances made by the Master for Engineering and Contingencies and Interest During Construction. The witnesses went into great particularity and detail in describing the assumptions upon which and the methods by which their conclusions had been reached. It was evident that every assumption adopted tended to lessen and not to increase these allowances. The percentages and amounts testified to by the witnesses exceeded those adopted by the Master. (See Rec., pp. 203, 208, 219, 220, 228, 265, 268, 277, 285, 286, 298, 891, 892, 893. Ex. C, p. 64. Ex. A19, Sheet 7, Rec., p. 958, folio 1192. Ex. A103, Rec., pp. 1067, *et seq.*)

For instance, Metcalf and Anderson found, and plaintiff claimed (Ex. C, p. 64), an item of overhead cost, for preliminary expenses and organization, of $120,000. This the Master disallowed (Record, p. 136, Finding 42), although it was well sustained by undisputed evidence (Record, p. 265). Again Metcalf and Anderson found, and plaintiff claimed, that in the acquisition of the lands, overhead costs for legal and engineering expenses and contingencies would be incurred to the aggregate amount of $65,464 (Record, pp. 955, 957). This the Master disallowed (Record, p. 125, Finding 15), although well sustained by undisputed evidence and although it is obvious that such costs must be incurred.

The decisions dealing with these questions plainly demonstrate the necessity and propriety of such allowances, and further demonstrate that the allowances here made by the Master are extremely moderate.

As to the propriety and necessity of the assumption that the structures would be reproduced under contract, and that the Company would, in addition to the contract cost, incur overhead costs and the loss of interest during construction, see:

Floy on Valuation of Public Utility Properties, pp. 64 *et seq.*;

Foster on Engineering Valuation of Public Utilities, p. 34;

Des Moines Water Co. vs. City of Des Moines (see Whitten on Valuation, p. 221, Sec. 246);

Town of Falmouth vs. Falmouth Water Co., 180 Mass. 235; 62 N. E. 255, 258.

As to allowances for overhead costs and Interest During Construction, the necessity therefor and the amount thereof, see

Whitten on Valuation of Public Service Corporations, Vol. 1, Secs. 240-302; Vol. 2, Secs. 1180-1204,

where the authorities are listed and quoted from, and many allowances relatively much greater than those made by the Master in the case at bar shown to have been made both by courts and commissions.

See also:

Floy on Valuation of Public Utility Properties, pp. 91-128;

Hayes on Public Utilities, Their Cost, New, and Depreciation, Secs. 37-49;

Foster on Engineering Valuation of Public Utilities, pp. 17 *et seq.;*

Montana, etc., R. R. Co. vs. Morley, 198 Fed. 991;

Pioneer Tel. & Tel. Co. vs. Westenhaver, 29 Okla. 429; 118 Pac. 354, 357;

Brunswick Water District vs. Maine Water Co., 99 Me. 371; 59 Atl. 537;

Metropolitan Trust Co. vs. Houston, etc., R. R. Co., 90 Fed. 683, 689.

We respectfully submit that the Master's allowances for Engineering and Contingencies and Interest

During Construction are amply sustained by the evidence, are not open to question by appellants, and are extremely moderate. Certainly they resulted in no injustice to appellants.

IX.

FAIR VALUE. THIS WAS DETERMINED BY CONSIDERATION OF EVERY RELEVANT FACT. THE VALUATION FOUND WAS MOST CONSERVATIVE, AND ONE OF WHICH APPELLANTS CANNOT COMPLAIN. IF JUSTLY SUBJECT TO ANY CRITICISM, IT IS THAT THE VALUE FOUND WAS TOO LOW.

In the Minnesota Rate Cases, 230 U. S. 352, speaking of the fair value of the property, which must be the measure of the adequacy of rates, the court said (p. 434):

> "The ascertainment of that value is not controlled by artificial rules. It is not a matter of formulas, but there must be a reasonable judgment having its basis in a proper consideration of all relevant facts."

As we have already pointed out (*supra*, pp. 195 *et seq.*), the Master valued the lands (Class A), the water rights (Class B) and the personal property (Class T) according to what he found to be the present normal market price for similar property. He valued the structures (Classes C to S) according to the re-

production-cost-less-depreciation method; and he valued the status of being a going concern according to the testimony of experienced and informed witnesses, modified by his own judgment, based upon considerations which he mentions; and as a result arrived at a total figure ($13,415,899). In arriving at this figure, as we have also pointed out, the Master resolved every doubt in favor of appellants and against appellee, and erred, if at all, on the side of conservatism.

But before adopting this figure as the present fair value of the property by which to measure the adequacy of rates, the Master tested it by the application of "reasonable judgment having its basis in a proper consideration of all relevant facts;" by comparing it with the conclusions of all witnesses who had testified concerning reasonable value of the entire plant (which conclusions were invariably greater than his own); by comparing it with the cost to the City of providing a duplicate plant, which cost he found to be in any event greater than the valuation determined by him; by a consideration of the adequacy and present condition of the plant and the character of service which it rendered, all of which he found to be excellent; and by a consideration of the question whether fair rates, measured by the valuation thus determined by him, would exceed the value of the service to the consumer, finding expressly that they would not. By a consideration of all of these matters he found and determined (Finding 48, Rec., p. 138) "that $13,415,899 is the fair and reasonable value of the property used by the Water Company for the convenience of the public," and a proper rating base by which to measure the adequacy of the return afforded

by the rates in question. This also we have hereinbefore fully explained, with appropriate references to the record (*supra*, pp. 202 and 203).

We venture the assertion that no rate case has ever come before this court in which the guiding rules applicable were more closely observed, the evidence in the lower court more complete, the consideration by the Master more thorough, intelligent and conscientious, or the valuation found more conservative. The Master was an experienced and accomplished lawyer. The decisions of this court by which the guiding rules have been established were constantly before him. The inquiry involved the entire body of rates, and therefore all of the property, all of the expense, and all of the revenue connected with or relating to the public service in which appellee was engaged. No necessity existed to segregate property or apportion expenses or earnings. Every item of information in any wise relevant to the inquiry was freely produced, fully and clearly set forth, and carefully considered by the Master. The result is one of which, certainly, appellants cannot justly complain. It is also true that the final result necessarily flowing from the Master's prior determinations is one of which appellee may not complain, because that result was a decree in its favor.

It is obvious that the ordinance is invalid and the rates which it prescribes confiscatory, and the decree so adjudged. That adjudication would be no more complete or conclusive even though large additions were made to the valuation found by the Master. Nevertheless, appellee contends, and by its cross-appeal presents the contention, that the Master's valuation was in fact unduly low. This contention is pre-

sented not because appellee complains of the final decree—which it does not, for said decree was in its favor—and not because it seeks reversal of said decree, for such is not appellee's purpose. On the contrary, the cross-appeal was taken, and these contentions are urged, not to reverse but to support the decree of the lower court, and to demonstrate that the total fair value as found by the Master was certainly not more, and, as we contend, was less, than the evidence justified and required. (*Supra*, pp. 35, 36.)

1. *The Master's Valuation Was Less Than Any Previous Valuation of the Same Property, and Less Than That Resulting from the Testimony of Any Witness in the Case at Bar.*

The former board of appraisers found the value, as of January 1, 1908, to be $14,400,000. This valuation was found by disinterested and highly qualified appraisers selected by the parties pursuant to a contract between the City and the Company, which (Rec., p. 19, Sec. 4) required them to ascertain such value. We submit that the valuation thus ascertained is in effect an agreed valuation, and that both parties are conclusively bound by the determination that the property in question was on January 1, 1908, of a fair value of $14,400,000. The determination of this fact was by a special tribunal of the parties' own selection, and the procedure was analogous to that considered by this court in Omaha vs. Omaha Water Co., 218 U. S. 180. Such being the nature of the determination, it was and is as conclusive as the valuation of the

franchises to which this court referred in Willcox vs. Consolidated Gas Co., 212 U. S. 19, 43, 44.

The authorities are a unit in declaring that a determination of such a fact in such a way is conclusive for all purposes.

3 Cyc., 728, 735;

2 A. & E. Enc. of Law, 2d Ed., pp. 794, 805.

Three of these appraisers testified in the present case. As we have already shown (*supra*, pp. 24, *et seq.*), they brought the appraisement down to date by adding the cost of new structures and deducting depreciation. One of them also added the conceded increase in the value of water rights which had occurred in the interval. As a result, his determination of value at the date of the inquiry was $16,259,078; the valuations found by the other two were, respectively, $15,370,000 and $15,300,000, without any addition for increased value of water rights which they conceded but did not include. With such addition their figures also would have equalled or exceeded $16,000,000.

Metcalf and Anderson's valuation, the details of which have been hereinbefore described, was, as of October 31, 1913, $16,038,379 (Exhibit C, p. 64).

The valuation made by the Public Utilities engineers was, as we have already shown, incomplete (*supra*, pp. 27, *et seq.*). Confessedly, it did not include either going value or any value for water rights, although these engineers when testifying admitted that both should be included (*supra*, pp. 227, 228 and 377, 378). The corrected total of the incomplete

valuation as found by these engineers was $10,021,681 (Exhibit 54, Sheet 6A, Rec., p. 1090, Fol. 1380). Adding, as we must, for purposes of comparison, the value of the omitted items, the results are as follows: Using the value of the omitted items as found by the Master (Rec., pp. 121, 123), we add for going value $800,000 and for water rights $2,947,617, bringing the valuation, based upon the estimate of the Public Utilities engineers, to $13,769,298. This exceeds the valuation found by the Master

But the Public Utilities engineers included certain items excluded by the Master. For instance, from Class A, Lands, the Master excluded a number of items the total valuation of which exceeded $110,000 (Rec., p.127, Finding 21; Exhibit C, pp. 111, *et seq.*). Notwithstanding this, their total valuation on lands was $513,601, as compared with his total valuation on the same class of property of $637,814. The difference is $124,213. Considering the property which they included and he excluded, the actual difference on lands alone is $234,213. The details of their land valuations appear in the record at pages 1083, *et seq.;* those of the Master at pages 124 and 125. It does not admit of doubt that their land values were inordinately low; this the Master found and the evidence demonstrates. The Master's land values are not questioned by the appellants. Using the land values found by the Master, instead of those determined by the Public Utilities engineers, the resultant total valuation, based upon the Public Utilities engineers' partial determination, would be $13,893,511. This still further exceeds the Master's total valuation of $13,415,899.

But the determinations of the Public Utilities engineers respecting structures were also in many respects erroneous and unduly low; this the Master finds (p. 134, Fol. 205½). Indeed, as the record demonstrates (Rec., pp. 414-440, 442-448, 881-896; Exs. A98-A104, Rec., pp. 1033-1075), if the things which they omitted were included, and the palpably erroneous assumptions which they made corrected, the fair contract cost as determined by them would have equalled, if it did not exceed, that determined by Metcalf and Anderson; and if to that result we add those things necessary to be added to fair contract cost, in order to complete the valuation, the result would be a figure substantially the same as that found by Metcalf and Anderson, Freeman, Holman and Hazen, and very much greater than that found by the Master.

We have hereinbefore reviewed the testimony of defendants' witnesses Gaffy and Bickel (*supra,* pp. 212 *et seq.*), and demonstrated that, viewed in any aspect, their determinations necessarily result in a total value greatly exceeding that found by the Master. We submit that the Master's valuation is far less than any heretofore determined by any board, commission or tribunal, and far less than that which necessarily results from the testimony of any witness in this case, either for plaintiff or for defendants.

2. *In the Exclusion of Items of Property and Elements of Value, and in the Reduction of Values, the Master Resolved Every Doubt Against Appellee and in Favor of Appellants.*

The extreme conservatism of the Master and his anxiety to avoid any injustice to the City of Denver

or the consumers of water, who were payers of the rates, was manifest throughout. It is particularly evident in his treatment of all questions relating to the valuation. Whenever a question arose as to whether a particular item of property possessed peculiar availability and adaptability, and therefore special value, he resolved the question against appellee, and added nothing to current market price on account of such special availability and adaptability. Whenever a question arose as to whether certain property was or was not to be included in the valuation as a portion of the plant, he invariably excluded it whenever there was the slightest doubt as to whether it was indispensably necessary thereto. Whenever a question arose as to unit prices or as to quantities, he almost invariably adopted the lower. It is our contention that in these particulars the rules applied by the Master operated too strongly against appellee. Some illustrations of this follow:

As to Class A, Lands, the total valuation allowed by the Master was $637,814 (Rec., p. 125); the valuation found by Metcalf and Anderson and claimed by plaintiff was $920,103 (Ex. C, p. 64). As already pointed out, the Master (Rec., p. 127) excluded from the list of lands valued a number of items which Metcalf and Anderson had included, the aggregate value of which was not less than $110,000. These consisted principally of the Platte Valley ranches, which were excluded as not being necessary to the water plant, although the evidence showed without dispute that it is necessary, or at least advisable, for the Company to retain them in order to make full use at all times of its water rights, and thereby preserve them undi-

minished (Rec., pp. 173, 310, 433). The lands excluded also covered the sites of Sullivan reservoir and Harriman Lake, both of which will be presently mentioned when we come to the structures excluded. In the matter of the lands, the Master also refused to consider any added value on account of special availability or adaptability, although the evidence in respect thereto was full and complete and without dispute. Thus he valued Item 1, Lake Cheesman reservoir site, at $160,000, although Metcalf and Anderson and the former board of appraisers had, considering its special availability and adaptability, valued it at $200,000 (Rec., p. 953); and he valued Item 17, Marston Lake reservoir lands, at $125,000, although Metcalf and Anderson and the board of appraisers, considering their special availability and adaptability, had valued them at $168,000 (Rec., p. 954). There were a number of other like instances.

Passing to Class B, the water rights, we have already pointed out (*supra*, pp. 334 *et seq.*) how the Master allowed for these $600,000 less than Metcalf and Anderson found and the Company claimed. The Master's valuation of water rights was substantially the same as that found by the former board of appraisers, although the evidence showed without dispute that, between the date of their valuation and that of the Master, the water rights had been enlarged and improved and had increased in value by at least twenty-five per cent. The Master also adopted as to the water rights lesser quantities and lower unit prices than those which were clearly justified by the evidence.

Coming to the structures, Classes C to S, the Master excluded every item of property and every element of cost or value about which there was the slightest question, although, as we think, in all cases the law and the evidence clearly justified their inclusion, and in many cases required it.

For example (Rec., p. 133, Finding 36), the Master excluded from Class I Item 6, Harriman Lake structures, net reproduction cost $10,541 (Exhibit C, p. 78), as he had already excluded the lands constituting the reservoir site (Rec., p. 127), having a value of $8,450 (Exhibit C, p. 112, Item 15), or a total of $18,991, although the evidence showed without dispute that this reservoir was distinctly useful and was actually used for the purpose of supplementing and protecting the city supply (Rec., pp. 170, 317).

From Class J (Rec., p. 133, Finding 37) he excluded the structures, as he had previously (Rec., p. 127, Finding 21) excluded the lands, constituting the office and superintendent's residence at Littleton. This exclusion amounted in the aggregate to approximately $13,000.

From Class L (Rec., p. 133, Finding 38) he excluded the structures of Sullivan reservoir, as he had previously (Rec., p. 127) excluded the site. The depreciated value of the structures as found by Metcalf and Anderson was $132,000 (Rec., p. 274), and the value of the site was $2,000 (Exhibit C, p. 112), making a total deduction of $134,000 on this account; and this notwithstanding the fact that this reservoir, which is a large artificial basin, although not at the time of the valuation in actual use, was really useful

and had great potential value as a part of the plant, and plans had already been made to utilize it (Rec., pp. 274, 436).

From Class S, the distribution pipe system, the Master made large deductions (Rec., pp. 133, *et seq.*, Finding 39). He deducted the item of Pavement over Mains, having a gross reproduction cost, without overhead or Interest During Construction, of $539,558, and the items of cost attributable to parallel tracks and conduits of other utility companies, having a like gross reproduction cost of $109,992, an aggregate of $649,550 without overhead or Interest During Construction, although the evidence clearly demonstrated that in the reproduction of the plant it would be necessary to incur these costs, to cut and replace the existing pavements and care for the overlying tracks and conduits, and that the estimate of reproduction cost would certainly be incomplete without their inclusion. The Master bases their exclusion upon the decision of this court in the Des Moines Gas case (238 U. S. 153). It is true that in that case the Master had excluded somewhat similar items, and this court refused to reverse the decree based upon the entire report of the Master. We submit, however, that that does not necessarily indicate a conclusive determination by this court that such items should, under all circumstances, be excluded.

It is manifest that if one, about to enter the water-works business, were considering whether he should build a new plant or buy the existing plant, his decision would be influenced and the price which he would pay for the existing plant enlarged by reason of the fact that if he bought the existing plant he

would not have to cut and replace these pavements, and care for and avoid these obstructions, and incur the necessary cost incident thereto, whereas, if he built a new plant, he would. Plainly, viewed in this light, value is added to the existing plant by these considerations. It is of no moment that this value was added by reason of something for which the Water Company did not pay and for which, perhaps, it was not responsible. That is true of all increments of value arising from increased population, a rise in the current market price of real estate and other like matters; but, as has been conclusively determined and as we have hereinbefore shown, the utility is entitled to all such increases (*supra*, pp. 189 *et seq.*). Moreover, reproduction cost necessarily and logically contemplates the reproduction of the identical plant under present-day conditions (*supra*, pp. 209 *et seq.*). For all of these reasons, we submit that the doubt in this case, if any, concerning the large items mentioned above ought to have been resolved in favor of the inclusion and not the exclusion thereof. The depreciated value of the items so excluded was not less than $650,000 (Exhibit C, p. 97).

From Class S the Master also excluded the value of taps for private consumers, having a gross reproduction cost, without overhead or Interest During Construction, of $140,038. These had been included by Metcalf and Anderson and their value claimed by the Company because, while, under the rules of the Company, the cost thereof was required to be advanced by the consumers, yet, under the same rules and by force of circumstances, they became the property of the Company. Notwithstanding this, the Master ex-

cluded them because they had not been paid for by the Company. But, as has been conclusively determined, the question as to what an item of property cost, or whether it cost anything at all, is of no moment. If it be actually owned by the utility, it is entitled to its value (*supra*, pp. 189 *et seq.*). The depreciated value of this item of taps for private consumers was (including Interest During Construction) approximately $130,000 (Exhibit C, p. 97).

As to Class T, Personal Property (Rec., p. 135, Finding 40), the Master valued the articles comprising this class at their wholesale price f. o. b. Denver, and refused to allow anything on account of the cost of conveying them along the plant, arranging them in convenient places for distribution, and there maintaining them, although these acts were necessary, and unquestionably added to the value of the property at least their cost. (*Supra*, p. 201.) This deduction amounted to approximately $30,000.

As to going value, in spite of the fact that the proof abundantly sustained an allowance of at least $1,200,000 and the fact that the undisputed evidence required an allowance of at least $1,100,000, the Master's allowance was only $800,000, a deduction of $300,000 or $400,000, made without any apparent and, we submit, without any sufficient reason. (*Supra*, pp. 374 *et seq.*)

The Master excluded reasonable overhead costs to the amount of $185,464 (*supra*, p. 389), thus effecting a horizontal reduction, by elimination, of that amount. He also further reduced the allowance for overhead costs by applying the percentage (12½%) to a lesser base than that testified to by the witnesses.

Moreover, he rejected the claim (Record, p. 136, Finding 43) for an allowance of $100,000 for working capital, although it was well sustained by undisputed evidence (Record, p. 270, Ex. A-24), and although the necessity, in so large a business, of at least such a relatively small amount of working capital is self-evident.

We will not go further into details, although there were many other instances of like character. What we have said is sufficient to clearly demonstrate that all doubts were resolved against appellee and in favor of appellants and for the reduction of the valuation. The sum of those deductions only which are hereinabove specifically referred to exceeds $2,000,000. The addition of this amount to the present fair value as fixed by the Master would reduce the rate of annual net return under the ordinance from .0364, as found by the Master, to .0317 and (assuming that 8 per cent per annum is the requisite rate of return) would increase the value of the plaintiff's property taken for public use without just or any compensation, from $7,305,649 (*supra*, p. 164) to at least $9,305,649.

The matters hereinabove referred to are the subject of appellee's exceptions to the Master's Report and its assignment of errors upon which its cross-appeal is based (Record, pages 1121 *et seq.*, 1168 *et seq.*, 1176). As hereinbefore explained (*supra*, pp. 34, 35, 36) appellee's exceptions and assignment of errors were filed and its cross-appeal taken not to reverse the decree, but to insure its affirmance. The papers on their face expressly so state.

The ordinance is in any event totally invalid. On the issue of confiscation the value might be increased by many millions and the rate of return decreased to the vanishing point and yet the ordinance be no more invalid. When totality is reached, the ultimate has been achieved. This, of course, appellee and its counsel fully realize. Nevertheless, the matters hereinabove referred to are called to the court's attention because they plainly demonstrate the ultra-conservative character of the Master's valuation and because they make it clear that said valuation may in any event be accepted by the court, without, to say the least, doing any injustice whatsoever to appellants.

3. *The Cost to the City of Providing a Duplicate Plant Would Greatly Exceed the Value of the Present Plant as Found by the Master.*

The Master found (Rec., p. 138, Finding 48) that "a new plant capable of serving the public with like efficiency cannot, according to the evidence, be built for $13,415,899." This finding is not made the subject of any exception or assignment of error. The evidence clearly demonstrates its correctness.

Mr. Freeman, testifying in this case, said (Rec., p. 205, Fol. 294) that it would cost the city approximately $20,000,000 to provide a duplicate plant.

The engineers of the Public Utilities Commission in their report stated (Rec., pp. 73, *et seq.*) that it would take at least five or six years to construct and assemble such a duplicate plant, and that the approximate cost thereof would be $12,750,000 if diversion made from the Eastern slope, or $16,250,000 if diver-

sion made from the Western slope, the latter being the course which they recommended. That this estimate was only an approximation, they frankly admitted, and qualified it with this statement, "All estimates of cost of a new system throughout must be approximations, which experience would probably prove to be erroneous in many particulars. Necessary information, such as surveys and detailed plans would develop, is wanting in every essential element." Moreover, they recommended strongly against any attempt to construct a new plant, and in favor of the purchase of the existing plant. They pointed out that during the period of five or six years required for the constructing and assembling of the new plant the city would be obliged to forego and therefore would lose the net revenue which it might have enjoyed from the existing plant if, instead of constructing, it had purchased. This they regarded as a loss and therefore a cost, in addition to the other costs incident to the construction and assembling of the new plant. This is substantially the equivalent of the development expense to which the city would be put in constructing the duplicate plant and bringing its business to the level of that now enjoyed by the existing plant, and was regarded by the Public Utilities engineers as an important reason why the existing plant should be purchased and no attempt made to construct a duplicate plant (Rec., pp. 74, 1079, 1080, Ex. A-106). The loss to which the City would thus be subjected, they stated, would be $290,365.45 for each of the five years of the assumed construction period, or a total of $1,451,827.25. But an important error in their assumption is to be noted, in that they should not have used

the net income after deducting interest upon the bonds, as they did, but should have used the net income applicable to the payment of interest charges and dividends found by deducting from the gross revenue the operating expenses, taxes and depreciation allowance, which net income, according to their figures, would have amounted to the sum of $824,571 per annum, or for the five-year period a total of $4,122,855. Therefore, if consideration is to be given to this loss (and the Public Utilities engineers say it must be included in the estimate), the total cost of the alternative plant, based upon the theory advanced by them, would be not less than $16,000,000, and would be more likely to exceed $20,000,000.

Moreover, the estimate of the Public Utilities Commission was based upon grossly erroneous assumptions. As an illustration of this, the total amount which they allowed for lands and water rights was $750,000 (Rec., p. 73), although the Master found (Rec., p. 122) that the lands necessarily included in the present plant were, measured by current market prices, worth $637,814 and the water rights $2,947,617. The fact that these items of cost were grossly underestimated by the Public Utilities engineers is plainly demonstrated by the testimony of every witness who appeared in the case at bar, and particularly by the testimony of Mr. Fellows himself (Rec., pp. 611, 612). We therefore submit that the estimate of the Public Utilities engineers is equivalent to a finding that the cost of a duplicate plant would be not less than $16,000,000, and more likely $20,000,000.

In this connection we take the liberty of informing the court of a fact which does not appear from

the present record, because the transaction out of which it arose began after all of the evidence herein was taken, and was not completed until long after the final decree herein was entered. Nevertheless it is a fact of importance, one which appellants cannot, and of course will not, question, one which is a matter of public knowledge because it relates to a public transaction and one which it is only fair that this court should know.

In 1915 the City and County of Denver, through the Public Utilities Commission, evidently realizing that the estimate of the cost of a new plant contained in the report of the Public Utilities Engineers filed in January, 1914, was, as it was plainly stated to be, incomplete and doubtless inaccurate, employed a firm of non-resident, impartial and thoroughly competent engineers to make a complete investigation of and ascertain and report the cost to the City of such a new plant, duplicating that in existence. Pursuant to said employment the engineers in question came to Denver and with a large force of assistants were there engaged upon this work for more than a year, concluding their investigation and making their report on December 14th, 1916. The cost to the City of this investigation and report exceeded $86,000, which is an evidence of the thorough and complete character of the work. As a result of their careful, comprehensive and complete investigation these engineers reported that *the cost to the City of providing an adequate plant capable of serving the community and its inhabitants as efficiently as that of appellee, would be $27,479,498.57*, and these engineers also strongly recommended that the City and County of Denver

should, instead of attempting to provide a new and duplicate system, acquire the property of the Denver Union Water Company under the terms of the option agreement dated February 21st, 1916, to which we have hereinbefore referred (*supra*, pp. 3, 4, 5).

The facts recited above, all of which are indisputable, make it clear beyond question that the valuation found by the Master was, to say the least, not unjust to appellants. Indeed, it was more than just to them, and, in fact, unjust to appellee. It results with the certainty of a mathematical demonstration, that the total valuation as found by the Master may be accepted and acted upon by this court with the positive assurance that the property of appellee devoted to the public use was worth at least that much, and probably much more.

4. *Appellants' Contention That Present Fair Value as Found by the Master Should Be Reduced Because of the Lack of a Definite Franchise, or the Possibility of Municipal Competition, Is Untenable and Unconscionable.*

The contention outlined above is repeatedly urged by appellants (their brief, pp. 73, 119-125). It is not open to them because, except only as to the allowance of $800,000 for going value (Rec. p. 1136; Exc. 19th, p. 1154, Ass. XX), it is not even referred to in any exception or assignment of error.

In this connection it is said (page 120) that the appellee has no monopoly in that the City may at any time build its own plant and so, in effect, exclude the Company from the business of water supply, thereby reducing the value of its

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plant to its mere junk value; whereas, at another place in the brief (p. 65), it is urged in respect to going value that it should be eliminated or at least greatly reduced because the Company has a monopoly. The lack of consistency in these two statements is manifest.

But appellants' contention outlined above is monstrously absurd, clearly untenable and wholly unconscionable. Evidently, it so appears to appellants, for the words with which it is presented are pregnant with the spirit of apology. Thus, at page 121 of the brief, it is said: "So far as we are aware, municipal corporations are no more prohibited from driving 'good bargains' or 'hard bargains' than are individuals;" and again at page 124, "Denver has not done any act or thing to impair the value of the Company's property or to imperil the investment of its stockholders; it has simply taken advantage of a situation which was as inevitable as death; that is, the depreciation in the value of the property which necessarily arose from the loss of the monopoly which the Company had theretofore enjoyed." These words also convey the plain admission that Denver is undertaking to drive a "good bargain" or a "hard bargain," and to that end is "taking advantage of the situation."

The futility of appellants' contention is best shown by a homely illustration. A dollar is worth one hundred cents, both intrinsically and in the markets of the world. And yet what is it worth to the owner in whose pocket it is at a time when he is being held up by a highwayman at the point of a pistol? And under such conditions how much would anyone

pay to change places with that owner and accept the contents of his pocket?

The gist of appellants' argument is this: Appellee's definite franchise in the streets of the City has expired; therefore the City may at any time expel it therefrom; appellee has no exclusive contract or monopoly; therefore the city may at any time build its own works, take the business away from appellee, and force it to sell its plant for junk.

But it has never yet been held that because of the expiration of the Company's definite franchise the city may expel it from the streets. All that this court held in the former litigation (229 U. S. 142) was that the city was at liberty to build its own plant.

While it is true that since April 10, 1910, the Company has had no definite franchise, in the sense of an express contract, vesting it with the right to occupy the streets for a specified period, nevertheless, it has ever since occupied said streets without any attempt on the part of the City to revoke its right so to do. Indeed, it was and is, and will continue to be, indispensably necessary to the City and its inhabitants that the Company continue so to occupy the streets, because the City and all of its inhabitants are solely dependent upon this Company for their water supply. Even though it be within the power of the City to revoke the right to occupy the streets (which is not conceded), nevertheless, it has not revoked it, and certainly will not attempt to do so until it has provided itself with a duplicate plant and water supply adequate for all the needs of itself and its inhabitants.

As yet, it has not even commenced the building of a new plant. It is conceded by all that from the date of such commencement at least five or six years, and probably much longer, will be required to complete and put into operation such a duplicate municipal plant. The definite rights granted utility companies to occupy the streets of a city are in Colorado limited to twenty years, and the definite period expressly mentioned in Ordinance 44, Series of 1890, expired on April 10, 1910. If this date marked the expiration of the definite right of the Company to occupy the streets, then, from what has been said, it is evident that the Company's present franchise must run for at least thirteen years from that date and the Company is today, so far as street rights are concerned, in no worse position than that which it occupied in 1904, when its definite franchise still existed and had six years to run.

But would appellants contend that if this valuation had been made in 1904 anything should be deducted from present fair value because the definite franchise had only six years to run, or is it appellants' contention that the loss of value, which they claim, occurred suddenly at that hour of the tenth day of April, 1910, when the twenty-year period specified in Ordinance 44, Series of 1890, expired? Is it their contention that property which on the 9th day of April, 1910, was used in supplying Denver and its inhabitants with water, and had on that day a fair value, as the former board of appraisers said of at least $14,400,000, had on the 11th day of April, 1910, a fair value of not to exceed $6,000,000, although it remained the identical property, still supplied Denver

and its inhabitants with water, and would so continue to supply them for an indefinite period? The service which it rendered was the same and worth as much on April 11, 1910, as on April 9, 1910. Why, then, should its rates be any less? And yet, if appellants' theory be correct, such rates could with impunity be, by public authority, reduced more than sixty per cent., and yet escape the charge of confiscation.

If appellants' theory be correct, why should a city ever grant an extension of franchise, or why should it ever purchase the works of a public utility, or even build its own plant? If the law be as appellants say it is, the city is at liberty to sit tight, take the benefit and use of the service afforded by the present plant, leaving the ownership and operation thereof in the hands of its present owners, and neither grant a new franchise, build a new plant, or purchase the existing plant, and at the same time is at liberty to reduce the present rates by about two-thirds, and also is at liberty to continue such a situation indefinitely. A theory which leads to such manifestly absurd and utterly unjust results cannot be sound.

If appellants' answer be that if the Company is not pleased with such a situation it may withdraw from the business, the obvious reply is that it cannot withdraw without inflicting upon Denver and its inhabitants an injury which would almost result in communal extinction, and that it cannot withdraw without the loss of practically its entire investment because its works are massive and permanently installed, and, except for its water rights and lands, the elements of its plant have practically no value for any purpose other than that to which they are devoted. And our

reply would begin and end with the words which Mr. Justice Brewer once used in characterizing a very similar contention: "Apples of Sodom were fruit of joy in comparison" (C. & N. W. vs. Dey, 35 Fed., 866, 880).

As a matter of fact, and as is well known, public utilities are not established by private capital, nor are their rates fixed, with a view to any such conscienceless and reprehensible attitude on the part of the municipality at the expiration of the term of the definite franchise. If they were, then it would be not only the right but the duty of the public utility, privately owned, to charge such rates for its service as not only to afford a fair return upon the capital invested, but also to amortize practically the entire value of the plant at the expiration of the definite franchise; for, as this court has said (Knoxville vs. Knoxville Water Co., 212 U. S., 13) the utility "is entitled to see that from earnings the value of the property invested is kept unimpaired so that at the end of any given term of years the original investment remains as it was at the beginning. It is not only the right of the company to make such a provision, but it is its duty to its bond and stockholders and, in the case of a public service corporation at least, its plain duty to the public."

If it be now the purpose of the City of Denver to build its own municipal plant, and thereby destroy that of appellee, and if it is also the intention of the City, as under the circumstances it must be, to avail itself of the service of the existing plant until its own is completed, it is not only the right but the duty of appellee to impose rates for the service furnished dur-

ing such period sufficiently large to amortize nearly the whole value of its plant by the time the municipal plant is completed. The distinguished engineers and operators and managers of water works plants who were witnesses for appellee in the court below all so testified, explaining their reasons at length (Rec. pp. 200, 205, 207, 231, 234, 235, 236, 283, 284, 295 (folio 400), 299). They also testified that even such rates, though substantially double those which the Company now imposes, would not exceed the value of the service rendered. This is so because the going rates are unduly low and the value of the service exceedingly great. But such rates would certainly be very high and so burdensome to the consumers as obviously to be practically intolerable.

In this case no franchise value was claimed, and, as the Master expressly stated (Rec. p. 136, Finding 42), none was allowed. So far as appellants' contention is based upon the lack of a definite franchise, the true rule is and must be that, except for the exclusion of the value directly assignable to the franchise itself as a distinct item of property, the present fair value of the entire property is, for purposes of rate-making or condemnation, the same, although a definite right to occupy the streets for a specific period be lacking.

So far as appellants' contention is based upon the possibility of municipal competition, it is important to observe that the situation today differs in no respect from that which has at all times since 1871 existed. Neither this Company nor any of its predecessors has since said date had an exclusive franchise, or any contract, or other arrangement with the City which prevented the City from itself at any time building a

competing plant, or authorizing others so to do (Exhibits ZZ, A-1, A-2, A-3, Rec. pp. 927-941). Not only has the City at all times possessed the right to compete, but even before the expiration of the twenty-year period mentioned in Ordinance 44, Series of 1890, it frequently threatened so to do, and in 1900 actually voted and caused to be engraved and executed the bonds with which to build a competing plant (*supra*, p. 10). And in 1889, by authority of the City, the competing plant of the Citizens Water Company was installed and operated—to the complete ruin of the older existing Company. (*Supra*, pp. 7, *et seq.*) It is plain that appellants' contention would in this aspect have been as good if addressed to the situation which existed in 1900 or any other year in the history of the plant as it is when directed to the year 1915.

But is it not most illogical and manifestly absurd to say that for the reason asserted the fair value of the water plant as it existed at any date in its history has always been much less—approximately seventy per cent less—than the actual cost on said date of the installation of its various elements (after deducting all depreciation caused by age, wear, or obsolescence)? And yet, reduced to its essence, such is the exact contention of appellants.

The fallacy of appellants' argument lies in the fact that they ignore the distinction between *exchange value* (meaning the price which some other corporation or group of individuals might be willing to pay for the public utility, privately owned, with a view of continuing its business), and *fair value* (by which is meant that *just compensation*, to which the owner of the property is entitled whenever it or its use is

taken by public authority, and which in case of condemnation measures the award, and in case of rate regulation measures the adequacy of the return).

It is obvious that *exchange value* as defined above may be greatly and seriously affected by the attitude and acts of the community which is being served. It was for this reason, and none other, that, as the Master found (Rec. p. 121, Fol. 184), the parties hereto agreed that the market value of the outstanding stock and bonds of the Water Company would not aid in determining the present value of the Company's property. For it does not admit of doubt that the attitude and acts of the City of Denver set forth in the historical review with which this brief is introduced (*supra*, pp. 5 *et seq.*) have seriously and prejudicially affected the marketability and market value of the Water Company's securities. And the courts have frequently held that for such reasons the market value of securities affords no guide to present fair value of the property.

> Spring Valley Waterworks vs. San Francisco, 192 U. S., 137, 145;
>
> Des Moines Water Co. vs. City of Des Moines, 192 Fed., 193, 197;
>
> Consolidated Gas Co. vs. City of New York, 157 Fed., 849, 861.

But appellants' contention as now made is plainly inconsistent and in conflict with their previous agreement, as found by the master.

To permit the attitude and acts of the community served, which necessarily affect *exchange value*, to likewise and in the same measure affect *fair value*

for rate or condemnation purposes, would, as is obvious, place private capital invested in public utilities in a situation where it would be absolutely at the mercy of the uncontrolled whim, caprice and even malice of the communities and consumers served.

So far as the construction of the municipal plant is concerned, it has not yet been built nor even commenced, although the threat of the construction of such a plant, evidenced by Section 264a of the Charter, remains. It is, as was said by this court (Willcox vs. Consolidated Gas Co., 212 U. S., 49) "a proposition almost unthinkable" that the City of Denver will, for the purpose of making competition and destroying the present plant, proceed at enormous expense with the construction of a duplicate municipal plant. This is especially true here, since, as found by the Master (Rec. p. 139, Finding 52), the existing plant is adequate, complete and in every respect satisfactory, and the service which it renders excellent; and since, as also found by the Master (Rec., p. 138, Finding 48), and as demonstrated in the preceding pages, the cost to the City of providing a duplicate municipal plant will be greater—indeed, enormously greater—than the fair value of the existing plant as fixed by the Master; and since, as has already been shown (*supra*, pp. 3 and 4), the City may, if it chooses, purchase the existing plant at the fair value thereof as fixed by the Master.

Much more might be said, but that which precedes should suffice. Appellants' contention is clearly illogical, monstrously unjust and wholly unconscionable. No court of justice can or will countenance it. It is in conflict with fundamental and elementary

principles of right dealing and common honesty and falls within the prohibition of express constitutional provisions.

In Yick Wo vs. Hopkins, 118 U. S., 356, this court negatived in most emphatic words a similar contention, and in the course of its opinion said (p. 371):

> "Accordingly, in the case of the State of Ohio, ex rel., etc., v. Cincinnati Gas, Light & Coke Co., 18 Ohio St., 262, 300, an ordinance of the City Council purporting to fix the price to be charged for gas, under an authority of law giving discretionary power to do so, was held to be bad if passed in bad faith, fixing an unreasonable price for the fraudulent purpose of compelling the Gas Company to submit to an unfair appraisement of their works."

In Knoxville Water Co. vs. Knoxville, 189 U. S., 434, 438, the court said:

> "It is argued here that the reduction of rates is not reasonable and is or may be taking a first step towards a compulsory purchase of the Company's plant at an unfairly low price by cutting down its value. We may assume, with the Supreme Court of Tennessee, that if rates were reduced unreasonably, a judicial remedy would be found. We may assume, further, that an attempt to affect the price of the Company's plant in that way, if the City should elect to purchase, would not be allowed to succeed."

In San Diego Land and Town Co. vs. Jasper, 189 U. S., 439, 443, the court said:

> "Of course, as we indicated the other day in Knoxville Water Co. v. Knoxville, ante, p. 434, if an attempt had been made to cut down values by the reduction of rates, the courts would know how to meet it."

Se also Dobbins vs. Los Angeles, 195 U. S., 223, 240.

In Lincoln Gas & Elec. Light Co. vs. City of Lincoln, 182 Fed., 926, it was claimed by the City that the Company's franchise had expired and for that reason fair value, exclusive of franchise value, should be reduced; but the court refused to pass upon the claim that the franchise had expired, holding the question immaterial, and determined the present fair value of the plant according to the reproduction-cost-less-depreciation method, without, however, adding anything on account of franchise value, and also without deducting anything because of the lack of a franchise. On this subject the court said (182 Fed., 930):

> "The question as to whether or not complainant's franchise is a perpetual one, or has already terminated, has been argued, but that question is not properly involved in the case. The ordinance prescribing the rates to be charged in effect admits that complainant is properly occupying the streets and alleys, and whether such occupancy is by reason of a perpetual franchise or by sufferance is not involved in the proper determination of this case."

Lincoln Gas & Elec. Light Co. vs. City of Lincoln, 223 U. S., 349, is this court's decision upon the Company's appeal. The lower court had determined that even with fair value ascertained in the manner aforesaid the rates had not been shown to be confiscatory, and had decreed accordingly. In the court below the testimony had been taken before and the initial findings made by the district judge holding the circuit court. The decree was reversed because the findings were not sufficiently complete and specific, with directions to refer to a special master for complete findings. The case was in effect remanded for a new trial, but this court did not criticize, and apparently approved, the decision of the lower court concerning the lack of a definite franchise, because it sent the case back for trial and left that determination to be the guiding rule in the next ascertainment of fair value.

In Henry L. Doherty, et al. vs. Toledo Rys. & Light Co. and City of Toledo (*infra*, Appendix A, p. 429) the United States District Court for the Northern District of Ohio was considering the validity of an ordinance passed by the Toledo City Council reducing the fares of the Street Railway from five cents to three cents per person. The Street Railway Company's franchise had entirely expired, and it had no definite right longer to maintain its tracks or operate its cars in the streets of the City. The City by its ordinance offered to grant it a new franchise if it would accept the three-cent fares, but the Company refused, claiming the three-cent fares to be confiscatory, and brought its suit in the Federal Court to enjoin the enforcement of the ordinance rates. Notwithstanding

the lack of definite franchise mentioned above, the Company continued to operate and to collect fares at the five-cent rate prescribed by it. It claimed the right to collect fares which would afford it a net revenue commensurate with the investment in its property, as measured by its present fair value, notwithstanding that it had no right to remain in the streets or continue in the business, and that the City was threatening to exclude it entirely from the streets unless it accepted the three-cent fares. The Company's contentions were in all respects upheld; the present fair value of the property was ascertained and no diminution thereof permitted because of the lack of a definite franchise. Measured thereby, the rates were found to be confiscatory, and the enforcement of the ordinance was enjoined. Among other things, the court says (*infra*, p. 430):

> "It is unnecessary to cover again in full the discussion then had of the relative rights of the Company on the streets *without franchise* and the City. It is sufficient here to say only that the Company might run its cars from day to day, until forbidden by the City, at such rate as it was able to collect, *and that it had the right to charge a rate that would pay its operating expenses and leave a surplus equal to a fair return upon its real investment.*" (Italics ours.)

In Newburyport Water Co. vs. Newburyport, 168 Mass., 541, 554, Mr. Justice Holmes, then a member of the Supreme Court of Massachusetts, remarked:

> "Of course, an offer by a water company" (to sell to the city) "made under the threat of municipal competition and to avoid ruin, might be voluntary only in name, but we have no reason to assume in this case that the petitioner is the victim of robbery, and must treat it as having acted of its free choice in fact as well as in form."

In Cedar Rapids Water Co. vs. City of Cedar Rapids, 118 Ia., 234; 91 N. W., 1081, 1090, it was held that after the expiration of the Water Company's franchise the Company did not become a trespasser upon the streets of the City, but was entitled to remain therein at least until the City in some proper way terminated the privilege; and that continuing to accept water service and passing an ordinance regulating water rates after the expiration of the period of the franchise, constituted an implied consent by the City to the continued occupation of the streets by the Water Company. It was further held that under such conditions the Water Company was entitled to charge and receive rates which would afford a reasonable return upon the fair value of its property, and that it could not be compelled to take less by virtue of the City's ordinance; the fair value, by which was measured the adequacy of the ordinance rates, was determined according to the method and upon the principles adopted and applied in the case at bar, and without any diminution because of the lack of a definite franchise.

In National Waterworks Co. vs. Kansas City, 62 Fed., 853; 65 Fed., 691, the Circuit Court of Appeals

and the Circuit Court, each speaking through Mr. Justice Brewer, protected by decree in equity the property of the Waterworks Company until the City paid therefor its present fair value as determined by the court, without diminution because of the lack of franchise, although the franchise under which the Company had operated was expressly limited to twenty years, and although the controlling statute forbade the municipality to confer any right to operate the waterworks for any period beyond twenty years from the date of approval of the ordinance. In that case the Waterworks Company, with the approval and under the protection of the courts, continued to operate the waterworks long after the expiration of said twenty years and until its property was purchased by the City at its fair value, determined as aforesaid.

In 2 Abbott's Municipal Corporations, Sec. 457, p. 1155, it is said:

> "The specific grant of the power to establish and maintain a water supply has been held to include the power to purchase from private persons a plant wholly or partially constructed and in operation. When this right is available, municipal authorities often endeavor to drive a bargain and force a sale, by the private company, of its plant, by refusing to pay a fair value, the interests of bona fide investors suffering by the transaction. It has been held that such a proceeding is a taking of property without due process of law. Such a forced sale is generally sought to be effected by either the threat of competition, a refusal to extend a franchise

for no good or sufficient reason but that of compelling the private corporation to come to its terms or by failing to pay water rentals due under legal contracts, making fictitious objections to the quality or quantity of a water supply, with the purpose of creating litigation in order to effect the same purpose."

In Dillon on Municipal Corporations (5th Ed.), Vol. 3, p. 2199, Sec. 1315, the learned author sums up the entire matter as follows:

"On the expiration of a franchise to furnish water or light and to use the streets of the municipality in connection therewith, for a limited term, the rights of the grantee, unless so provided by law or contract, do not immediately and totally terminate, and the grantee does not become a trespasser on the city streets. A public service corporation has been engaged in the performance of a work of public utility. That service was, of necessity, of a nature which required the occupation of the streets with pipes buried in the soil, with connections therefrom of more or less permanence of character to the buildings and premises of consumers. These improvements could not be removed, nor to any extent interfered with, during the term of the franchise, without interrupting the service the corporation was bound to render; and it must be presumed, where the grant or contract is silent on the point, that it was con-

templated by the parties that the corporation should remain in possession such *reasonable length of time after the expiration of the term as might be necessary to negotiate an extension or renewal of the franchise, or, in default thereof, to close out its business without unnecessary sacrifice.* Even when *the franchise has expired* and the city has a reserved right or option to purchase the property of the company, the *title* to the water or lighting plant or system *does not vest in the city*, until the company has been paid or tendered the value thereof. If the city continues to accept a service of water or light from the company and assumes to regulate the rates therefor, this *gives implied consent* to the continued possession of the streets and operation of the works until such time as the city shall, by reasonable notice, see fit to terminate the corporation's tenure of the privilege. And so long as the corporation continues to perform the service and the city continues to accept it, the obligation of the city and other patrons to pay a *reasonable compensation* therefor will continue. If, after the expiration of the franchise, the city exercises its right to prescribe reasonable rates, *it must do so under precisely the same limitations and conditions as to reasonableness which applied before the expiration of the franchise.*" (Italics ours.)

We therefore respectfully submit that appellants' contention herein before discussed is totally without

merit and so unconscionable that it should not have been advanced.

X.

CONCLUSION.

From what is hereinbefore set forth, doubtless at too great length, the following conclusions are inevitable:

1st: The ordinance in question is invalid because merely an arbitrary exercise of power and not a legislative act, and because it was passed without notice, or hearing, or opportunity to be heard, without investigation, consideration or determination as to the propriety or justice of the ordinance, or of the rates which it prescribed, and in total and intentional disregard thereof. Thereby appellee's rates were reduced by more than twenty per cent., and it was deprived of its property without due process of law, regardless of the question whether the rates so fixed were confiscatory or not; consequently, all questions relating to the issue of confiscation are moot (*supra*, pp. 56, *et seq.*).

2nd: Four hundred and eighty-eight thousand eight hundred and twenty dollars ($488,820) is the largest annual net earning which can possibly be realized under the ordinance rates, and eight per cent. is the least rate of annual net return which will escape the charge of confiscation. It follows that the ordinance rates are confiscatory and the ordinance invalid, no matter what view might be taken of any or all of appellants' contentions concerning valuation. In any

event, property owned by appellee, and having a value of from $4,507,532 to $7,305,649, is taken for public use without just or any compensation (*supra*, pp. 164, 165); consequently, all questions relating to valuation are moot (*supra*, pp. 158, *et seq.*).

3rd: The Master's valuation was extremely conservative and has, beyond possible doubt, been fully sustained (*supra*, pp. 185, *et seq.*). It certainly was not too great; it was, if anything, too little. The ordinance is, therefore, unquestionably invalid because thereby property owned by appellee and having a value of not less than the sum of $7,305,649, is taken for public use without just or any compensation (*supra*, p. 164).

4th: Viewed in any aspect, and for all or any of the foregoing reasons, the ordinance is certainly invalid. The court below by its decree so adjudged, and enjoined the enforcement of the ordinance. It inevitably follows that such decree should be affirmed.

Respectfully submitted,

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Of Counsel.

APPENDIX A.

IN THE DISTRICT COURT OF THE UNITED STATES, NORTHERN DISTRICT OF OHIO, WESTERN DIVISION.

Henry L. Doherty, Charles T. Brown and Frank W. Frueauff, Partners Doing Business Under the Firm Name and Style of Henry L. Doherty & Company,

Plaintiffs,

vs.

The Toledo Railways & Light Company and The City of Toledo,

Defendants.

MEMORANDUM OF OPINION ON MOTIONS OF THE PLAINTIFFS AND THE DEFENDANT, THE TOLEDO RAILWAYS & LIGHT COMPANY, FOR TEMPORARY INJUNCTION.

KILLITS, J.:

The first motions in this case for temporary injunctions to restrain the operations of the so-called Schreiber ordinance were denied because then the City was neither attempting to enforce it nor by its terms allowed to enforce it except through an order

of a competent court before which the complainants could charge and prove, if possible, that it was confiscatory and consequently invalid. The consequence of this opportunity to the complainants to resist an order of enforcement left this court powerless to apply the extraordinary remedy of injunction. The court then had jurisdiction of the main case, to which the motions were plainly ancillary.

It is unnecessary to cover again in full the discussion then had of the relative rights of the company on the streets without franchise, and the City. It is sufficient here to say only that the Company might run its cars from day to day until forbidden by the City at such rate as it was able to collect, and that it had the right to charge a rate that would pay its operating expenses and leave a surplus equal to a fair return upon its real investment, and further, at any time the company might discontinue service, take its cars off the streets altogether, and remove its tracks. The City, on the other hand, might either forbid the company absolutely the use of the streets, or, permitting the use, impose therefor reasonable regulations respecting service and rates of fare.

The ordinance in question never having been accepted by the Company, the initiative for enforcing it was upon the City, and that fact was recognized by its author in the provision directing the City Solicitor to go into court for an order on the company to observe it. It is not an ordinance which the City can enforce through its police power.

Conditions have radically changed, however, since last March. During the intervening months, the City's executive, neglecting the direct and only

proper method of enforcement which the ordinance itself provided, but which involved a decision of the contention loudly urged by the Company that it was oppressive and unreasonable, attempted indirectly its enforcement through an encouragement of reliance upon its terms by individuals. The uncontradicted evidence in this hearing shows that, taking the indefensible position that the measure was self-enforcing, the officers of the City assumed an attitude of sustaining private judgment, even to the extent of suggesting that the power of the City would be employed to assist any individual who attempted to enforce his opinion of his rights under it. This was a wholly indefensible position. To have placed at the call of any individual, to enforce his judgment that he should ride at three cents, a policeman, would have been as flagrant an abuse of power as to have given the same individual police aid to enforce any other private right he assumed to have without any other adjudication than his own consideration.

By the ordinance itself, the Company was given the right to question its obligations thereunder in a duly constituted general forum for the adjudication of responsibilities and was not obliged to submit to the view of any person who chose to board its cars. The effect of the City's attitude, however, was practically an enforcement, and the Company was faced with the alternatives of submitting without a test or of suffering innumerable annoyances and suits in the nature of damages, and, in all probability, violence. It is to deal with precisely these situations that courts of equity are open to suitors of any class, and this corporation, as is the case with any individual person,

is under the protection of the guaranties of the federal constitution.

We hold, therefore, that the court may now, as we could not before, inquire into the charge that the ordinance is confiscatory in its effect, and, if we find the facts clearly sustaining the charge, we may apply the extraordinary remedy of injunction.

This ordinance, as in the case of any other legislation, is favored by every presumption. It is presumed that the public agencies concerned in its production acted intelligently, honestly and providently, and that its terms are reasonable and fair. The fact that a piece of legislation enjoys these presumptions does not, however, make it invulnerable. It may still be attacked in any of these particulars, the presumptions having the effect only of testimony of validity, wherefore clear evidence against it may be adduced to overcome them and to set it aside. The court also, while bound to indulge these presumptions, may look to the surroundings for a measure of their strength. The law of Ohio provides rules to secure deliberation in the passage of ordinances of this kind. Three readings on three different dates are required to precede the adoption of such a measure, unless some emergency or other proper reason impels a suspension of the rules by a three-fourths vote of the council.

This measure, not to go into effect for four months and not for three months after the incoming of a new council and a new administration, was passed to adoption through three readings at one sitting by a council and urged by an administration whose friends had just suffered defeat at an election.

These circumstances suffice to start speculation upon the value of the presumptions. When, however, we find, as the testimony here shows without dispute, that, at the time this ordinance was passed and signed, the executive of the city was not only possessed of statistical information in most illuminative detail from its trusted expert, which, properly considered, showed that a three-cent fare was confiscatory, but that also the force of such statistics to this effect was pointed out in advice privately given in writing and orally by this expert to the executive, with reasons why a three-cent ordinance should not be passed, and, further, that the city had, in November, 1913, no evidence or light whereon to base a fixing of rate except that given it by its own chosen expert to the above effect, it does not take a very acute mind to see that these vaunted presumptions descend nearly to the level of mere legal figments.

However, the court on this hearing honored them to the full by requiring the movants to sustain the burden of their charge that the ordinance was unreasonable by clear evidence, and it was not until, through the testimony of the City's own expert, Nau, and a showing of the experience of the Company, a volume of evidence was had which demanded that the City produce support for the failing presumptions upon which it relied, that the court required any action at all by the City. Every possible facility was afforded the City to support the ordinance, the court adjourning the hearing for five weeks for that purpose. The record now shows in evidence comprehensible to every intelligent man, and derived from testimony in which there is absolutely no dispute, that

this ordinance is unfair and that to attempt to enforce it is to attempt confiscation.

The City Solicitor, after struggling against the inevitable as long as possible, finally, and commendably, confessed that it was impossible either to get any other evidence than that before the court or to draw any conclusion from the testimony, which he could not dispute, than that at the rate of three cents the Company's revenue would do more than barely pay running expenses, leaving nothing for a return upon the investment. There are some lines in the City on which a fare under three cents would pay operating expenses; there are lines on which six cents and even seven cents would not even expenses. There is one line whose revenue does not meet one-third of its expenses, and others whose returns are but one-half to two-thirds of their outlays. Averaging all the lines together, if the public insists upon the present routing, any man capable of doing sums in simple arithmetic can see that an average rate of three cents is too low. It is demonstrated from the record that if every person who has ridden on the cars since March 27th, last, whether he had paid or not, had paid three cents, the income of the Company would barely have paid its expenses, and the months since March are the months of a year when traffic is the heaviest and expenses the lightest.

It is beyond dispute from this record that this ordinance is unreasonable and unfair, wherefore it should be declared invalid, and an order to that effect may be entered.

JOHN M. KILLITS,

September 12, 1914. Judge.

The United States of America,
Northern District of Ohio,
Western Division, ss.:

I, B. C. Miller, Clerk of the District Court of the United States within and for said District, do hereby certify that I have compared the within and foregoing transcript with the original Memorandum Opinion filed in the proceedings of said Court in the therein entitled cause, at the term, and on the day therein named; and do further certify that the same is a true, full and complete transcript and copy thereof.

WITNESS, My official signature and the seal of said Court, at Toledo, in said District, this 2nd day of November, A. D. 1914, and in the 139th year of the Independence of the United States of America.

B. C. MILLER, Clerk,
[SEAL] By J. W. WILSON,
Deputy Clerk.

APPENDIX B.

No. 9174.

The People of the State of Colorado, ex rel. City and County of Denver,
Petitioner,

vs.

The District Court of the Second Judicial District of the State of Colorado and the Hon. John W. Sheafor, Presiding Judge of Division No. 1, of said Court, and J. D. Brown, Robert S. Brown and George William Brown,
Respondents.

PETITION FOR WRIT OF MANDAMUS.

Mr. James A. Marsh,
Mr. Thomas H. Gibson,
For Petitioner.

Messrs. Goudy, Twitchell & Burkhardt,
Mr. H. R. Kaus,
For Respondents.

GARRIGUES, J.

STATEMENT OF THE CASE.

This is an application to compel the district court of the City and County of Denver, to enter a decree in accordance with our judgment and opinion in the case of City and County of Denver vs. Brown, et al., 56 Colo., 216.

In the general statutory adjudication settling the relative priority of irrigating ditches in water district No. 8, on the South Platte river, what is now known as the City ditch, was awarded priority No. 1, by original construction, date November 28, 1860; priority No. 75, by first enlargement, date November 1, 1873; and priority No. 131, by second enlargement, date March 7, 1881. The volume of these appropriations, while determined by the decree, is immaterial for the purposes of this case. July 21, 1902, an action was brought in the district court to have adjudicated the respective rights of consumers from this ditch and June 15, 1908, the court entered what is termed the original decree in that behalf. The City and County of Denver as the proprietor and owner of the ditch and in possession of its decreed appropriations, brought the case here for review. The trial court in that case decreed and held that the consumers from the ditch were the appropriators from the stream with vested perpetual water rights in the ditch for the amount used, which accrued and continued from the date water was first utilized from the ditch on the lands of the consumers, regardless of the amount contracted for, and, being the appropriators from stream owning the ditch appropriations, they were in no way affected by their contractual relations

with the ditch owner, or by cessation in the use of water short of abandonment. In November, 1913, we reversed the case and handed down a written opinion in which we held this ruling and decision of the district court, under the circumstances of this case, fundamentally wrong in every particular; that the original company constructing and owning the ditch as well as its successors in interest were in possession of and controlled the appropriations and must be treated as a ditch owner carrying water for hire, that is, a carrier ditch as distinguished from water users who own the ditch and its appropriation, and also as distinguished from mutual ditch companies in which stock issued to the members represents the consumer's interest in the company, ditch and water; that the water was obtained each year from this carrier ditch by contracts between the respective consumers and the ditch owner entered into annually; that the consumers were all contract users and that the consumers' rights depended upon and were limited and controlled by these contracts; that the contract user was not an appropriator from the stream, nor the proprietor of an appropriation, nor the owner of a water right in the ditch in the full sense of these terms; that while the ditch company was not the owner of the water, it nevertheless owned the right to divert the decreed appropriations awarded the ditch and to charge a rental annually for its carriage, which in effect constituted it the proprietor of the appropriations; that the ditch owner owned, controlled and possessed the right to divert the ditch's decreed appropriations, and, the consumer having contracted for and used a specific volume for a certain year, had the option and was entitled

to contract for the same amount each succeeding year upon tender annually, without intermission, of the lawful rate; that when the contract expired, if he ceased further use from the ditch, he would then be in the same position in the future as one executing a new contract; that his right each year to water from the ditch is not a perpetual right, but is limited by the terms of an annual contract; that when the consumer severs this contractual relation by not renewing the contract, the contractual obligation of the carrier with the consumer is ended, except of course, that the consumer has an option to renew the contract within a definite time from year to year, and if he fails to do so the owner may contract the use and carriage to another who would possess the right of renewal each year until he ceases in the use; that the contracts measure and limit the consumer's right, and in addition contain a privilege or option to purchase the use of so much water annually, if exercised within a certain time each year, without intermission; that a contract user has a right to continue by contract in the future use as against subsequent purchasers, but when he ceases to contract and use the water, he loses the right as against intervening purchasers and his future right to water, if any is obtainable, will begin from the time he again contracts. As to the reservation in the right of way deeds, we held the right reserved, constituted an option which the consumer must exercise each year and if he neglected to do so, he stood on the same plane as other contract users. As to the excess water, which term will be comprehended by those familiar with the litigation, we held the limitations imposed by the city upon the users of

this water were in effect a lease of the amount not necessary for the city's present needs and preserve the water privilege in the city the same as though it had continued in the use. As to the parties who, from their pleadings and proof, had not established under the rule announced in our opinion, that the city was under obligation to furnish them water, we held they were without rights that could be adjudicated or recognized in that suit.

March 4, 1914, remittitur was issued to the lower court; March 15, 1915, the Brown heirs filed supplemental claim; March 24, 1915, the court entered what is termed the second decree; November 15, 1916, the city filed a motion in the district court asking that court to vacate and hold for naught the second decree and enter a decree complying with our judgment and remittitur; March 10, 1917, the district court overruled the motion; and March 17, 1917, an original petition was filed in this court which among other things alleged:

> "That the said district court of the second judicial district, and the said judge thereof, have at all times refused and neglected, and still refuse and neglect, to comply with the terms of said opinion, remittitur and mandate of this court, and to enter a decree in said cause in accordance with the views expressed in said opinion and with the terms and commands of this court embodied in said remittitur and mandate; and that no decree has ever been entered in said cause by said district court, or any judge thereof, in accordance with the views so expressed in

> said opinion, and the commands of said remittitur or mandate, or otherwise or at all; and the said court and the said judge thereof intend to and will, unless compelled by this court to enter a decree in said cause in accordance with the views expressed in said opinion and the terms of said remittitur and mandate, continue to refuse and neglect to comply with the same."

and praying:

> "1. That an order or writ of this Honorable Court issue, commanding the respondents to show cause why said judgment or said decree has not been entered according to the opinion and mandate of this court.
>
> "2. That this Court issue an order commanding the said respondents, John W. Sheafor, as presiding judge of said Court, and said Court, to enter said decree immediately in accordance with the opinion and mandate of this Court."

The answer filed May 2, 1917, is merely a reiteration of the original theory of respondents, sustained by the district court in the original decree, condemned by us as erroneous in every particular, and reiterated again by it in the second decree which shows upon its face that it was entered upon exactly the same theory as the decree reversed. April 28, 1917, a demurrer was filed to this answer upon the grounds: That it appears from the face thereof, that it does

not state facts sufficient to constitute an answer, or return, or defense in favor of respondents.

GARRIGUES, J., after stating the facts as above:

1. The district court entered the first decree upon the theory that each consumer was an independent appropriator from the stream, of the volume he took from the ditch and used upon his land, regardless of his contractual relations with the ditch owner. We reversed the case because the district court proceeded upon this erroneous theory, and, in a written opinion, directed it specifically to enter a decree upon the theory that the consumers were not appropriators and were limited, bound, controlled and governed by their contracts; that such contracts imposed no obligation upon them to continue taking the water if they did not wish to, but provided for a continuous series of annual transactions which the consumer might enter into or not, as he chose, and that to protect himself against others applying for the water, he must exercise the option each year; that if he should, at the expiration of his contract, fail to make demand for the water within the proper time, he would be in the position of one who had never received water and his future rights would date from the time when he again contracts and that, generally speaking, all the consumers were to be supplied alike from all the appropriations. We reversed and remanded the case with directions to the district court to enter a decree upon this theory without further pleadings or testimony, except testimony, if offered, to establish the relative rights of the consumers under

their contracts in and to the respective appropriations, if they were made to supply different classes of consumers, the general rule being, that where a ditch is awarded priorities of appropriation by original construction and by first and second enlargements, as this one was, that all the consumers stand upon an equal footing and are to be supplied alike from all the appropriations. And we pointed out that unless the testimony showed that the several appropriations were made to supply distinct classes of consumers, then the water privilege of each consumer extended alike to all the appropriations decreed the ditch. This was because the claim was made that the three appropriations awarded the ditch were to supply three separate and distinct enterprises or classes of consumers, and while all the appropriations were diverted by a common headgate and carried for some distance through a common canal, still they were in fact to supply distinct and separate classes of consumers the same as though each appropriation had a separate ditch and headgate. On account of this claim, the opinion recognized that a ditch might embrace and have within, along and through it, several ditches in one, with a common headgate, each taken out to supply distinct purposes or enterprises. In such a case the different appropriations though awarded one ditch, would be as distinct and independent as though they were carried in separate ditches, each having its own headgate. If such were the facts in the case here, then of course this would have to be recognized by the city and by the court in the adjudication of the rights of the various consumers from the ditch; but each consumer would be en-

titled to be heard before his rights could be affected by such a decree. We therefore instructed the court to enter a decree upon the pleadings and testimony already taken, except testimony, if offered, to establish whether the different appropriations were made to supply different classes of consumers. If they were not, then all should stand alike upon an equal footing as to all the appropriations. Instead of complying with our directions and following the rule we laid down, the court permitted testimony to be introduced in direct opposition to our instructions, for the purpose of showing that the consumers were appropriators from the stream and owned the decreed appropriations, and entered a second decree upon precisely the same theory as the original. It not only failed to enter a decree in accordance with our directions but affirmatively acted in opposition to our mandate by receiving testimony for the purpose for which we said it should not be received. This is not merely error committed in an attempt to carry out our directions, it is disobedience constituting direct conflict between the two courts. The second decree is as much in direct conflict with the principles declared, with the rule laid down, and with the directions given in our former opinion as the first decree. A writ of review in such a case affords no remedy, and would only make the district court a court of last resort. Where the appellate court directs that a designated course be pursued, the inferior tribunal must yield obedience, otherwise our courts would be in hopeless confusion. The district court had no power and was without jurisdiction to do other than we directed. The second

decree is void, and the motion to vacate and set it aside should have been sustained.

Galbreath v. Wallrich, 48 Colo., 127-130;
Wells v. Littlefield, 62 Tex., 28-33-34;
Perry v. Tupper, 71 N. C., 380;
Patten Co. v. Canal Co., 93 Wis., 283-290;
4 C. J., 1221;
Elliott on App. Proc., Sec. 576.

In Galbreath v. Wallrich, *supra*, we said:

"The reason for this rule is obvious. When a particular judgment is directed by the appellate court, the lower court is not acting of its own motion, but in obedience to the order of its superior. What that superior says it shall do, it must do, and that alone. Public interests require that an end shall be put to litigation, and when a given case has received the consideration of this court, its merits determined, and then remanded with specific directions, the court to which such mandate is directed has no power to do anything but to obey the mandate; otherwise, litigation would never be ended, and the supreme tribunal of the state would be shorn of that authority over inferior tribunals with which it is invested by our fundamental law. By permitting the filing of the supplemental answer and cross complaint the trial court is proceeding contrary to what we directed."

"To permit a trial court to disobey in the least respect the mandate of this tri-

bunal, would inevitably mar the harmony of our whole judiciary system, bring its parts into conflict, and produce disorganization, disorder, incalculable mischief and confusion, by allowing judgments which we have directed to be modified, or questions injected into the case, after being remanded, the purpose of which would be to annul or modify the judgment which this court had directed should be rendered."

In Wells v. Littlefield, *supra*, the court said:

"If the ground taken by respondent's counsel, that we cannot issue the writ because the relator has his remedy by appeal, is to prevail, then this court will be without power to enforce its judgments in any cause. If the district court disobeys our mandate and the injured party appeals, and we again decide in his favor, that court may again disobey, and by continuing this course deprive us of all power to right any wrong which may be committed below. The position of the two courts will be changed. The district court will become the tribunal of last resort, and this court rendered subordinate to it in every respect."

The decree to be entered must of course be confined to the rights of the parties as they were at the time of the trial. It is to be expected that the rights of many of the consumers have shifted, that many changes have occurred since the trial and will occur

in the future, but in all changes in the use of water from the ditch, the rule of law we laid down in our opinion will continue as the guide and must of necessity be followed by the ditch owner in dealing with the various consumers in the future use from the ditch.

The trial court is directed to vacate and set aside the second decree entered March 24, 1915, and to proceed in conformity with the prior mandate of this court, and the writ issued herein will be made absolute.

Decision *en banc.*

Mr. Justice Scott and Mr. Justice Allen not participating.

STATE OF COLORADO,

IN THE SUPREME COURT OF THE STATE OF COLORADO.

The People of the State of Colorado, ex rel. City and County of Denver,
Petitioner,

vs.

The District Court of the Second Judicial District of the State of Colorado, and the Hon. John W. Sheafor, Presiding Judge of Division No. 1, of said Court, and J. S. Brown, Robert S. Brown and George William Brown,
Respondents.

I, JAMES R. KILLIAN, Clerk of the Supreme Court of the State of Colorado, do hereby certify that the foregoing is a true copy of an original opinion filed in the above entitled cause, on the 2nd day of July, A. D. 1917, and now remaining of record in my office.

WITNESS my hand and the Seal of said Supreme Court affixed at my office, in the City of Denver, this 12th day of July, A. D. 1917.

JAMES R. KILLIAN, Clerk.
[SEAL] By JAMES PERCHARD, Deputy.

In the Supreme Court of the United States

OCTOBER TERM, 1917.

No. 294

CITY AND COUNTY OF DENVER, ET AL.,
APPELLANTS,

vs.

THE DENVER UNION WATER COMPANY,
APPELLEE.

No. 295

THE DENVER UNION WATER COMPANY,
APPELLANT,

vs.

CITY AND COUNTY OF DENVER, ET AL.,
APPELLEES.

APPEAL FROM THE DISTRICT COURT OF THE UNITED STATES FOR THE DISTRICT OF COLORADO.

REPLY BRIEF OF CITY AND COUNTY OF DENVER, ET AL.

JAMES A. MARSH,
NORTON MONTGOMERY,
EDWARD C. STIMSON,
Solicitors for City and County of Denver, et al.

THE CLARK QUICK-PRINTING COMPANY, DENVER, COLO.

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In the Supreme Court of the United States

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No. 294

CITY AND COUNTY OF DENVER, ET AL.,
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REPLY BRIEF OF CITY AND COUNTY OF DENVER, ET AL.

INTRODUCTORY OBSERVATIONS.

The brief of appellee is striking in intensity and formidable in volume. Exceeding zeal has lead to

many assertions of fact and conclusions of law which would ordinarily not eminate from such eminent counsel. Nowhere is there a yielding spirit. According to appellee every position taken by appellant is untenable—wholly untenable. Out of the scores of questions raised and discussed appellant is always wrong—both in premise and in conclusion. Not even by the fortune of chance has appellant a single time taken the right view or made a correct statement concerning a single question. Even the people, living in appellant's city are the "irresponsible members of the general electorate" (Appellee's brief p. 66), are corrupt, with ulterior motives (Appellee's brief p. 29), turbulent and oppressive in their nature, going about like a roaring lion seeking what they may devour, while the appellee, clothed in its robe of righteousness, is always meek, humble and infallible in every transaction. Even counsel for appellant themselves are tainted with these same vicious propensities, and are charged with making statements alleged to be "loose," "false," "fallacious," "untrue" and made with "ill grace," so that this court will be driven to the record in each instance to verify their statements and to satisfy itself as to the veracity of counsel for appellant on all material questions.

When appellee's positions have been sustained the courts have always written learned opinions and expressed themselves through a distinguished member of the court, while if an expression of the court in any case is adverse to the position of appellee it is an "unfortunate remark of a single judge."

The record, though unusually voluminous and its correctness established by solemn stipulation of counsel and certified to by the trial court (Record page

1120), is wholly imperfect, incomplete and insufficient, and calls for numerous and extended statements wholly outside of and beyond its limits, notwithstanding the case is up for consideration before the bar of the highest and most august tribunal of the land.

In instances almost without number plain expressions of learned and consciencious courts have had to yield to what appellee's counsel believe must have been their spirit and intention; and by a subtle process of elimination and substitution courts of less keen vision could easily be misled, and the oracles of the law entirely obscured. All this can serve but to increase the labors of this court and impel it to a greater effort to scrutinize the record of facts and the decisions announcing the law. We are willing—entirely willing—to rest our case upon and within the record as here lodged, and upon the plain, ordinary meaning of the rules of law and court decisions bearing upon it.

Much has been said by appellee that is so foreign to the material issues and so wholly without merit that it would be presuming upon the duties and time of this court to give it even passing consideration. Conspicuous also are questions argued at great length, which are presented for the first time here and which were not raised in the court below, but on the other hand, evidently sometimes purposely omitted in the court below, and without an effort to show or even the termerity to argue that they are covered by the assignment of cross errors. As an illustration, the power of the City and County of Denver to enact such an ordinance as here involved is questioned in a discussion covering thirty-seven pages of the brief not-

withstanding an amendment to the bill of complaint found at page 81 of the Record not only strikes out the portion of the bill referring thereto, but evidences a clear intention to eliminate it from consideration in the case, and notwithstanding further that not a single one of the cross errors of appellee even so much as hints at the objection. Numerous other instances could be pointed out, but as they will be obvious it would serve no useful purpose.

It would ordinarily be supposed that the appellant and its counsel possess some attributes of truth and that sometimes to the undefiled some things would be pure, but a perusal of the voluminous brief leads to a forlorn hope as they march triumphantly on like the mighty Philistine to slay the shepherd boy representative of the children of Israel.

If the ordinance in question is confiscatory, in justice to the appellee it should be overthrown. If it is not and if a rate of return is being asked upon property and values which ought not to be allowed, and if the ordinance in question establishes a rate that will afford a fair return upon the reasonable value of the property of the appellee used and useful, this court will not hesitate to uphold it.

In our original brief we pointed out why the ordinance should be upheld. In making numerous deductions from a very voluminous record that we may have inadvertently fallen into slight inaccuracies goes almost without saying, and as they have been or may be discovered we will freely admit them. Perfection is not one of our attributes. But where errors have been unjustly charged, perhaps through unintentional error of opposing counsel, we shall

content ourselves with pointing out the facts as found in the record to enable this court to satisfy itself from its own deductions.

While there is something to be said on the side of the appellee on many of the questions its counsel have raised, their positions are far—very far—from being incontestable, and in some very important particulars they are wholly without support in law or in fact. Although counsel for appellee allege all the merits to be on their side of the case they spend much time and extensive space in an endeavor to shut out this court from a consideration of the merits of the controversy. If always right, why not be unafraid? With such an abiding conviction and such an intense confidence in the correctness and justice of their cause why tremble at being judged by a just tribunal?

This court has said that its power in such cases is best safeguarded against abuse by preserving to this court complete freedom in dealing with the facts of each case. That in view of the nature of the judicial power involved in such cases it is not tolerable that its exercise should rest securely upon the findings of a master even though they be confirmed by the trial court. In cases of this character the court will not fetter its discretion by artificial rules, however useful and well settled these rules may be in ordinary litigation. (Knoxville v. Water Co., 212 U. S. 1.)

In this case the appellee frequently urges that the findings of the master are conclusive, both as to the law and the facts, and that appellant is not at liberty to call them into question. A reference to the order referring the case to the master to take testimony and make observation as to the facts and the

law will hereafter be made. The master was merely the representative of the trial court. No halo of sanctity is cast about the results he reached or the report he made; his conclusions are no more binding than would be the findings of a jury or a trial court if the evidence had been taken before such jury or such court. It is true the trial court adopted the master's conclusions in their entirety, but they are nevertheless open to question at least to the same extent as the conclusions of fact and law of the trial court would be in any other case.

We do not understand that there is any force in the statement so frequently found in appellee's brief that because in our opening brief we did no dwell at great length by statement and argument, covering many pages, on certain questions presented by the record, that those contentions have been abadoned. Half a page is as sufficient as a volume if the point is sufficiently covered. Brevity is sometimes the soul of wit. If force of argument is to be determined by the number of printed pages, if a proposition once clearly stated is re-enforced by reiteration, if the same long quotations from court reports frequently repeated go for making strength, if bringing in and submitting to the court page after page of matter not in the record and entirely foreign to the question under discussion will help in any way to a correct solution of questions which are serious and important and vexing enough at best, then perhaps appellant must yield to appellee. If entirely unjustified criticism of lawyers engaged on the other side of the controversy may help, then certainly we are at a disadvantage. We will not enter the arena and engage in any such combat. We

doubtless have made mistakes and it may be that our judgment is not always sound, but we certainly would not here or elsewhere attempt to mislead any court, and we would not be so foolish as to consciously make misstatements to be subjected to the keen scrutiny of counsel, who are always willing to seize upon them and capitalize them at many times their face value.

On page 2 of the brief of appellee the first ground of attack is that the ordinance involved in this case is illegal on account of the manner of its passage. As already stated this ground of attack was stricken from the complaint by amendment (Record p. 81) which evidenced a clear intention to abandon the position, and it nowhere appears at any place in the record that this question was at any time even so much as mentioned in the court below. This subject will receive further attention later.

The court's attention on page 3 of brief of appellee has been invited to an option agreement which is nowhere to be found in the record. If it is permissible, if the proprieties of the occasion even so much as permit a reference to that which is wholly outside of the record, we are willing to admit that since the conclusion of this case in the court below the appellee has tendered to the appellant an option to purchase this property at a valuation not to exceed that fixed by the special master, or at any valuation to which the same may be reduced under the ruling of this court on any of the questions involved; but we do not understand that this converts the case into a purchase case. Certainly the City could not have obtained the option had not the appellee been abundantly willing to execute and deliver the same to the appellant, because it is an *option* given by the

appellee and not by the appellant. In the motion filed in this court to advance this case counsel for appellant had no intention whatever of in any way referring to any such subject wholly outside of the record. We said then and we say now that the determination of this case by this court will undoubtedly furnish a basis of further action on the part of the City and County of Denver for the acquisition of a municipal water plant, but what this action is to be is for the people and not for counsel to say.

Appellee says that for more than twenty years the controversy over the Denver water plant has "continuously raged" and has made many references which purport to say that the controversy has always been the fault of the City and its people, forgetting perhaps that a controversy cannot "continuously rage" without there being two parties to such controversy. They refer in their brief on page 7 to "the fierce competition" between the Denver City Water Company and the Citizens Water Company, and on page 8 say that the two companies were in active competition until 1894; that "a fierce rate war resulted," and they make other statements of a similar character. It thus appears that the fire of "controversy," which has so continuously raged, was kindled between two of the companies absorbed by the appellee, and if appellee has continued to burn inwardly with rage ever since it is not surprising. Many other references are made in the opening pages of appellee's brief to controversies which found their way into the courts, but it is sufficient to say that some of them were decided unfavorably to the appellant, and others unfavorably to the appellee, among which may be noted cases decided by this court:

City and County of Denver v. New York Trust Company, 229 U. S. 123; Wheeler & Lusk v. Denver, 229 U. S., page 123.

In the opening statement of appellee much stress has been laid upon former valuations and estimates of the value of the plant of the water company. All of these references are wholly immaterial because the ultimate question in this case depends upon the value to be fixed upon the property of appellee by the court in this very case and all of the conflicting evidence referred to was evidence which was submitted to and considered by the special master and is not now being made the subject of attack. Appellee refers to a higher appraisement alleged to be made by virtue of the terms of Ordinance No. 163 of the Series of 1907, but if this was evidence such discrepancy is explained by the admission of counsel for appellee where they say at page 29 of their brief that this discrepancy "is largely accounted for by the fact that the master excluded certain items of the property and elements of value which the other had included." They also refer to an unofficial report of an engineering committee of the Public Utilities Commission which, although it very properly excluded any value for water rights and going concern, was never adopted by the Public Utilities Commission.

Indeed if matters of this kind are evidence of value we would call attention to the fact that the people of Denver by amendment to their charter in 1910 adopted Sec. 264-A, in which they offered appellee $7,000,000 for all of its property used and useful in supplying the City and County of Denver with water, and on the refusal of the appellee to ac-

cept the tender commenced to spend an authorized issue of $8,000,000 to build a new plant, which appellee has been continuously endeavoring to prevent ever since.

(Wheeler & Lusk vs. Denver, 229 U. S. 342. Wheeler & Lusk v. Denver, now pending in this court on motion to dismiss.) Neither is controlling of value in this case.

In view of the psychological effect which appellee has sought to produce it is not inappropriate to say that it is the desire of appellant to preserve and not destroy, and that the appellant is not now approaching a settlement of this controversy in any spirit of bitter or unwarranted attack (page 24 appellee's brief) or with an "ulterior motive," or for the purpose of establishing fierce competition or of destroying or reducing values, but in a conscientious effort to see that right and justice may be done, both to the people of Denver and to the owners of the Denver Union Water Company, and to obtain the impartial opinion of the highest tribunal to which we may appeal for the purpose of furnishing a basis for the settlement of our honest differences. To destroy or confiscate the property of the appellee would be an injustice which would be reflected to the injury of the people in the community where the appellee is doing business, and would be an economic waste which would injure all.

Moreover our purpose and our only purpose is to see that justice as between the community and the Water Company shall be discovered and established in order that all disagreement may be forever set at rest; and harmony and tranquility permanently established.

As the completed brief of the appellee only came to appellant on September 12, 1917, less than three weeks before the date set for the argument of the case, it is needless to say that it would be a futile mental effort, as well as a physical impossibility, to analyze all of the cases cited by appellee and to reply to every criticism made by appellee in so short a time. We shall simply endeavor in this brief to cover some of the more important points and discuss some of the questions which it is thought may be the most helpful to the court in considering the case.

Counsel for the appellee imply that because we were not engaged in the trial of the case below, as they were, we are in some measure disqualified from a proper consideration of the questions here. While it is true we have not had the same advantage of becoming familiar with the facts as they have had, we have also not been under the disadvantage of laboring under impressions obtained in and out of the court below which are not borne out by the record.

ARGUMENT.

SCOPE OF THE REVIEW.

The first point argued by counsel for appellee is as to the scope of this review (pp. 37 to 55, appellee's brief). They argue, first, that the order of reference to the Master was by consent, and hence his conclusions are not open to question; and second, that inasmuch as the record does not contain all of the evidence taken that appellants are foreclosed from considering the evidence.

The order of reference in this case is as follows:

> "This cause being at issue and it appearing to the Court that the issues and the conditions as herein presented are so exceptional as to require the appointment of a special master and the reference of this suit to him for the purpose of taking testimony and reporting to this Court; all parties hereto consenting;
>
> It is ordered that W. J. Chinn of Colorado Springs be appointed Special Master in this suit with all of the powers conferred upon the Master under the rules of practice for the courts of equity of the United States, and subject to the further orders of this Court, with power, subject to review by the Court, to pass upon the legal admissibility of evidence. This suit is referred to said Special Master for the purpose of taking all testimony in the suit and reporting to the Court said testimony, his findings of fact and such conclusions of law as he may deem essential to the proper advisement of the Court. Each party will deposit within ten days $500 to be applied on Master's allowance" (Record, page 112).

Under the foregoing order of the Court and recitals as to consent therein contained, this is not a submission by consent of the controversy to the Master. It appears that the parties did consent that the reference be made to the Master for the purpose of

taking testimony and reporting to the Court, and the Court ordered that it be referred to the Special Master for the purpose of taking all testimony and reporting such testimony to the Court and his reporting his findings of fact and such conclusions of law *as he may deem essential* to the proper advisement of the Court. As far as the order itself is concerned, the reference in this case was not different from a reference to a referee. But assuming that the rule, as laid down by counsel in the cases cited, viz.: Kimberley vs. Armes, 129 U. S. 512; Davis vs. Schwartz, 105 U. S. 631, and in Adamson vs. Gillilland, 242 U. S. 350, are controlling in this case, it only means that the findings of fact of the Master would be taken as presumptively correct, subject to be reviewed when there has been error in the consideration given to the evidence or in the application of law.

We have not attempted in our original brief to attack the findings of the Master when his findings are the result of conflicting evidence. We have taken all of his findings of fact as presumptively true, but have from time to time questioned the sufficiency of the evidence and the character of the same, upon which the Master based his conclusions, and surely, even if it be conceded that the reference was by consent, or even that the whole matter in controversy was submitted to the Master, still his findings and conclusions could be no more conclusive than the findings of a jury, and surely no more conclusive than the findings of a trial court.

In rate making cases, however, where it is sought by a complainant to set aside in a court of equity the action of a legislative body, this Court has adopt-

ed a different rule as to the conclusiveness of the Master's findings.

In the case of Knoxville vs. Water Company, 212 U. S., page 1, the Court, by Mr. Justice Moody, page 8 of the opinion, says:

> "There can be at this day no doubt, on the one hand, that the courts on constitutional grounds may exercise the power of refusing to enforce legislation, nor, on the other hand, that power ought to be exercised only in the clearest cases. The constitutional invalidity should be manifest, and where that invalidity rests upon disputed questions of fact, the invalidating facts must be proved to the satisfaction of the Court. In view of the character of the judicial power invoked in such cases it is not tolerable that its exercise should rest securely upon the findings of a Master, even though they be confirmed by the trial court. The power is best safeguarded against abuse by preserving to this Court complete freedom in dealing with the facts of each case. Nothing less than this is demanded by the respect due from the judicial to the legislative authority. It must not be understood that the findings of a master, confirmed by the trial court, are without weight, or that they will not, as a practical question, sometimes be regarded as conclusive. All that is intended to be said is, that in cases of this character this Court will not fetter its discretion or judgment by any artificial rules

> as to the weight of the Master's findings, however useful and well settled these rules may be in ordinary litigation. We approach the discussion of the facts in this spirit."

The foregoing quotation from this Court is a complete refutation of all of the contentions of counsel with reference to the conclusiveness of the Master's findings, either of fact, or questions, as they express it, of "mixed law and fact," and whatever view may be taken as to the character of the reference in this case, yet under this rule this Court is not prohibited from and it is its duty to review not only questions of law, but also such questions of fact as may be necessary to be examined in order to determine whether the Master has committed error in any of his conclusions. We have followed strictly, we think, the rule as laid down in the case just cited. We have recognized that the findings of the Master should be given weight, and where questions of fact are involved, have treated his findings as presumptively correct, but as has been said, this Court should not be fettered by any artificial rules as to the weight of the Master's findings.

The court below should have given consideration to the exceptions which had been filed to the Master's report, should have investigated the evidence and weighed it, and from its own personal investigation of the record should have come to an independent judgment as to whether or not the findings, which were reported, were correct. The court below did not do this. It held that the findings of the Master were conclusive, both as to the questions of law and as to fact, and simply affirmed such findings in *toto*.

The ultimate question to be determined in this suit is as to whether or not the ordinance in question is confiscatory of complainant's property. All other questions are incidental, but in order to arrive at this ultimate question it is necessary to consider several independent elements. The first to be considered is the fair value of complainant's property used in furnishing water for Denver and its inhabitants. The next question in logical order is the return that the company is getting from its investment, and lastly, the rate of return after deducting taxes and operating expenses. On page 10 of the opening brief we have subdivided the topics for discussion, and each and every one of them raised by us are legal questions. As said before, we have challenged the sufficiency of the evidence, and have said that it is not of that character required in rate making cases where it is sought to set aside the action of a legislative body. On page 45 of their brief counsel say that the record "does not contain, nor purport to contain, all the evidence on all the issues, nor all the evidence on any issue decided by the Special Master," and cites the case of Sheffield Company vs. Gordon, 151 U. S. 285, in support of the proposition that in the absence of a certificate by the Master that the entire evidence taken by him was sent up with his report, it is impossible to impeach his conclusions upon it. There is no basis for this contention, as in paragraph 1 of the Master's report (Record, p. 118) he certifies as follows:

> "All of the testimony, as well as all exhibits offered on the hearing, are described in Exhibit A, and are returned and filed with this report."

The claim is also made that the evidence, in part, consists of that gained by actual inspection by the Master, and that, therefore, the Master's findings are conclusive. It has been held in some cases that where some particular fact was established before a jury, either by a view of the jury or by certain physical demonstrations, and when such fact was the controlling fact in the case, the Court would not disturb the verdict thus arrived at. The only thing in the record here, with reference to a view, is the statement of the Master in his report at page 141 of the record, wherein he states:

> "September 10th and 11th, at the request of complainant, I used in a journey to Lake Cheesman with counsel representing each party hereto."

Lake Cheesman is only one unit, and there is nothing in the Master's report to indicate that this little diversion in any manner influenced him or changed his opinion from what it would have been if he had not taken the trip. The request was made by the complainant, there was no consent to the trip, nor is it shown that any view was made of anything in which any facts were controverted by the parties. It is hardly necessary to argue so trivial a question as this. Bearing in mind the language of this Court in the Knoxville case, above referred to, that "it is not tolerable that its exercise should rest securely upon the findings of a master, even though they be confirmed by the trial court," it is unnecessary to pay any further attention to this claim.

Furthermore, the record in this case is here by stipulation, and it is agreed by respective counsel

that it contains the statement of the evidence that is to be used for the purposes of defendant's appeal and the cross-appeal of the plaintiff to the Supreme Court of the United States under Equity Rule 75, (Record, page 1120); and the parties having solemnly agreed that this statement, which is the record herein, is all of the evidence, both parties are bound by it. Counsel have made frequent references throughout their brief to our unfamiliarity with the evidence taken before the Master, and have copiously quoted from and stated evidence, which it is claimed was taken before the Master, but not included in this agreed record. We confess we are not familiar with the evidence taken before the Master, except as represented in this agreed record. We have taken the record, as we undoubtedly had the right to do, as a complete statement of all of the evidence in the case, and expect to stand or fall by what it contains.

In view of the stipulation filed herein, appellant had the right to assume that the record as prepared fairly and fully contained the matters necessary for the appellate court to have before it in a review of the case, and it is unbecoming of counsel, to say the least, to now say that the record is not complete. Counsel well know that the record was not prepared by the appellant, but was prepared by counsel themselves, and prior to the time arguments were had before the Master. Counsel not only prepared the record themselves, but agreed that what they had prepared was a full statement of the evidence; but notwithstanding this agreed record, counsel have all the way through the brief contributed matters not contained in the record in an endeavor to sustain their various contentions, and we refer to this, not

for the purpose of entering into an unbecoming controversy with counsel as to their good faith, but merely for the purpose of endeavoring to aid the Court in arriving at a fair conclusion of the matters reviewable in this case.

Exceptions to Master's Report.

On November 5, 1915, both the complainants and the defendants below filed their exceptions to the report of the Master. The exceptions filed in behalf of the City and County of Denver contained twenty-two separate assignments (Record, p. 1131), and after the Court had ruled upon these exceptions the City filed its assignment of errors, containing thirty-one separate assignments (Record, p. 1147); these assignments were full and complete. They pointed out with particularity all of the objections urged in appellant's original brief, and with more particularity than the rules of this Court require. It is not necessary, either in exceptions filed to a Master's report, or in assignments of error, to write a brief. It is only necessary to direct the Court's attention to the matters expected to be urged in support of the appeal.

As has been said before, the ultimate question involved here is as to whether the ordinance in question is confiscatory. The Master reported that after an examination of all the evidence he was of the opinion that it was confiscatory. No other direct issue was involved, yet for the convenience of the Court we have carefully enumerated in thirty-one assignments the various incidental questions, involving this ultimate question, and believe that in a case of this char-

acter, involving as it does, the act of a legislative body, in view of the Court's attitude in such cases, the Court should not circumscribe itself by any technical or artificial rules which would prevent it from a full and fair consideration of the matters necessary to be considered in arriving at the real question at issue in the case. It does not appear that the District Court made any examination of the evidence for the purpose of determining whether or not any questions were raised by the exceptions that could be passed upon by the Court, but nevertheless the Court held that all questions of fact raised by the exceptions were not open for consideration, and also that the exceptions did not raise questions of law for determination by the Court material to the case (Record, page 1138), and the Court thereupon approved and confirmed the Master's report and held the ordinance to be invalid and of no force or effect whatsoever, in that said ordinance attempted and did deprive the complainant of its property without due process of law (Record, page 1141).

The contention of counsel that the exceptions to the Master's report and the assignments of error herein are insufficient is technical in the extreme, and the cases cited by them in support of this proposition do not bear them out. They are cases in which there was either no exceptions made to the report of the Master, or in which the exceptions virtually amounted to a general denial of the whole report of the Master.

On page 52 of their brief counsel, under a separate heading, again raise the question of the sufficiency of the record and state that it was not pre-

pared for the purpose of presenting points now urged. They then follow this statement by referring to Rule 8 and Equity Rules 75 and 76, and state that the purpose of these rules is clear, and that is, to limit the record on appeal to those portions only of the record in the lower court essential to the presentation in the Appellate Court of the questions properly reserved in the court below, and state again that subdivision (b) of Equity Rule 75 requires that all parts of the evidence, not essential to the decision of the questions presented by the appeal, be omitted. Why their argument under this topic should be prefaced in the manner just referred to is not clear, for it is evident that the record in this case was prepared in strict observance of the rules referred to. The record contains almost 1,200 pages, in addition to the various exhibits that are included therein. There were few exceptions taken to the introduction of testimony, hence there was no purpose of setting out the examination of the witnesses by questions and answers, but it is evident that the transcript contains a narrative statement of all of the testimony introduced.

At page 53 of its brief appellee says that appellee refrained from objecting to the record as prepared, and also stated:

> "It is, to say the least, doubtful whether there are any questions open for consideration upon this appeal. If there be any, they are, at most, confined by the exceptions and assignments of error to a few naked questions of law. Obviously the appellant prepared the record with this in view, and in-

> cluded only those parts of the evidence '*deemed by them essential to the decision of the questions presented by the appeal.*' It is equally obvious that for the reason aforesaid appellee refrained from objecting to the record thus prepared."

Counsel not only refrained from objecting to what they themselves had prepared, but stipulated that the statement of the evidence, as prepared, was a statement of all of the evidence to be used on the appeal and cross-appeal. Now what is the evidence contained in the record that counsel say was deemed by the appellant as essential to the decision of the questions presented by the appeal? An examination will show that there is a complete narrative statement of the testimony of witnesses as to the value of the property in controversy as to the value of the so-called "going concern," to the depreciation item, to overhead charges and interest during construction, to operating expenses, to what would be a fair return, to the rate of return, and to various other questions which are incidental to these main questions. In fact, it is not shown that there was any evidence given before the Master not included in this record. When the statement of the evidence was agreed upon a number of the exhibits were by the agreement left out of the record, and probably for the reason that these additional exhibits were either duplicates of exhibits that were included by the stipulation, or were considered immaterial. In any event, the parties stipulated both as to what evidence would be considered on the appeal, and as to what exhibits would be included in the record.

METHOD, MANNER AND MOTIVE OF PASSAGE OF THE RATE ORDINANCE.

Pages 29 to 32 and 56 to 92, inclusive, of appellee's brief are devoted to a discussion of the method, manner and alleged motive of the passage of the rate ordinance.

This extensive disquisition is asserted to be in vindication of certain legal principles, but the discussion does not seem to arrive at any definite conclusion, is only partially concerned with matters in the record and is apparently used by appellee with a view to its moral effect. In other words, the whole object of the discussion is to create an atmosphere hostile to the appellant and favorable to the appellee, and in order to create this atmosphere appellee does not hesitate to indulge in various forecasts of what the City Council would have done and what the people of the City and County of Denver would have done, although, as a matter of fact, there is no proof whatever as to what would have been the course of any of these persons had they adopted a different course from that which they actually pursued. Disentangling, so far as we may, from the somewhat complicated and involved discussion of the appellee the cardinal points which it wishes to enforce, they seem to amount to this:

1. That the City Council passed the ordinance, not for the purpose of regulating rates, but with some ulterior and wicked motive, and particularly with the idea of hampering and damaging the business of the Company.

2. That the City Council passed the ordinance without consideration or examination and without giving the Company a hearing, which, appellee declares, rendered the ordinance void.

3. Lastly, it is asserted, so far as we can fathom the argument of the appellee, that the fact that the ordinance might have been submitted to the people for a vote under certain circumstances, although as a matter of fact, it was not, renders the ordinance void.

On page 76 of the record, at paragraph 16 of the bill of complaint, it is alleged that the ordinance in question was prepared under the direction of the Public Utilities Commission, *was introduced in the Council, and enacted, approved and published in accordance with the Charter of the defendant City and County of Denver.* Then follow the allegations that said ordinance was passed without consultation with the complainant and without notice or opportunity for complainant to be heard, and that neither the Public Utilities Commission nor the City Council attempted prior to its enactment, to investigate its fairness or justness, and that it was adopted for the purpose of crippling and hampering complainant, and to enable the City and County of Denver to purchase the properties of complainant at less than fair, actual, present value. There is no allegation, however, to the effect that the City Council did not have jurisdiction or that it did not have power to pass the ordinance, and the facts, as above briefly related, beginning immediately after the italicized words, were denied by the answer (Record, pages 102, 103, paragraph 16).

But these allegations of lack of notice and of failure to afford the Company an opportunity to be heard, and the failure of the City Council to investigate the fairness of the rate are allegations without avail insofar as raising the question of the legality of the ordinance is concerned; for the legality of its passage had already been admitted in the preceding portion of the section, and we will quote the words again with reference to the passage of the ordinance: "* * * *was introduced in the council and enacted, approved and published in accordance with the charter of the defendant City and County of Denver.*" (Italics ours.) After having made this admission in the allegation, its effect could not be contradicted by what followed, and the subsequent portion of the allegation must be treated as merely matters in aggravation of the complainants' contention that the rate fixed by the council was unjust and confiscatory or, at most, to rebut the presumption that obtains that the rate was reasonable, and it is evident that it was not the intention of the complainant in its bill to raise this question of the illegality of the passage of the ordinance. For if such had been its intention, it would not have stricken from the bill paragraph 24 (Record, pages 81, 90), which was as follows:

> "Twenty-fourth. Neither the Council of the City and County of Denver, or any of the members thereof, who passed or acted upon Exhibit 'A' (the rate ordinance) had any right, power or authority whatsoever to consider, enact or approve said Exhibit 'A' under Article XX of the Constitution of the State

> of Colorado, or of the Charter of defendant, the City and County of Denver, and each and every act and pretended act of said Council, and the members thereof, in reference to said Exhibit 'A,' is and was at all times of no effect whatsoever. *Said Exhibit 'A' is null and void and of no force or effect whatsoever because not legally passed or adopted by the Council of the City and County of Denver*, or any of the members thereof, having the power to act in the premises, and neither the Council of the City and County of Denver or any of the members thereof, had any right, power or authority to fix or attempt to fix the charges for services rendered and to be rendered by the complainant." (Italics ours.)

The allegation above quoted is the only allegation of the bill which raises the question of the power of the City Council of the City and County of Denver to pass the ordinance, and this was in conflict with the admission in Section 16 of the bill and was eliminated from the bill by an amendment (Record, page 90), said part being voluntarily eliminated by the appellee in order that but one question would be presented to the Court for its determination, viz.: the question as to whether the ordinance, fixing the rates was confiscatory. The purpose of the amendment eliminating this section was evident, and is further evidenced by appellees failure again to raise the question in the proceedings below. Furthermore, we have been unable in our examination of the record to find any evidence sustaining the allegations of para-

graph 16 of the bill as to the illegality of the ordinance.

The Master makes the observations on page 120 of the record that the Water Company had no notice from the defendant of the proposal to draft or enact the ordinance other than that given by its publication in a newspaper; that when the ordinance came before the City Council for consideration the members of the council were of the opinion that it was their legal duty to pass it without making any attempt to determine whether the rates prescribed by it were reasonable.

These observations of the Master were not findings and do not purport to be findings, but are simply preliminary observations. The findings and decision of the Master with reference to the validity of this ordinance are as follows: *"It is presumed that ordinance 26 of the series of* 1914 *is valid, and that the rates fixed by it are reasonable and fair, and therefore sufficient to permit the Water Company to earn a fair return for the use of its property by the public"* (Italics ours) (Record, page 120).

The findings of the Master just quoted were not excepted to by appellee, was not made the subject of an assignment of error, and therefore the question of the validity of the passage of the ordinance is not the subject of review by this Court, even were there issues and proof to sustain its invalidity.

It is nowhere alleged in the bill that the ordinance was passed by the Council under the belief that it was compulsory for the Council to pass it and the fact that the then City Attorney was mistaken as to the law with reference to the province and duty

of the City Council or as to the effect of the Council's act in passing the ordinance does not affect the City as to its undoubted legal rights.

Counsel has frequently throughout this brief assumed that the Council passed this ordinance at the behest of the signers to the petition, but the Charter does not so provide. The Charter provides, as is set forth in counsel's brief, page 64, that when a proposed ordinance is submitted to the Council by petition such proposed ordinance shall be passed by the Council without alteration, *or* the Council shall refer such proposed ordinance to the qualified electors. The Council has a perfect right to pass the ordinance if in its judgment and wisdom it should be passed, or it can refuse to pass the ordinance if in its judgment the ordinance should not be passed; but in case of its refusal it then becomes its duty to submit the ordinance to a vote of the people; but if the Council, as said before, in its judgment, sees fit to pass the ordinance, it is a legislative act; not the act of a commission exercising judicial power, but a legislative act, and an act which has the same force and effect as an act of the Legislature of a state.

On page 65 of their brief, counsel have referred to and quoted from Article 20 of the State Constitution, which is the home rule amendment; have referred to the cases in Colorado with reference to the purport of this amendment; have quoted from the Charter itself and have quoted from an amendment to Article 20 of the State Constitution, the same being Section 6 thereof, to the following effect:

> "All provisions of the Charter of the City and County of Denver * * * as heretofore certified and filed with the Secretary of State * * * are hereby ratified, affirmed and validated as of their date."

The following is the initiative provision of the charter referred to by appellee, viz:

> "Any proposed ordinance may be submitted to the council by petition therefor of qualified electors equal in number to at least five per cent of the last preceding vote for mayor, and such proposed ordinance shall be passed without alteration by the council, and if vetoed by the mayor shall be passed over his veto, within thirty days after such petition is filed, *or* the council shall refer such proposed ordinance to the qualified electors at the next municipal election held not less than sixty days after such petition is filed." (Page 142, Sec. 273, Charter, as revised to May 17, 1916.)

The provision in the charter referred to by counsel giving the City Council power to regulate rates is as follows:

> "All power to regulate the charges for service by public utility corporations is hereby reserved to the people, to be exercised by them in the manner herein provided for initiating an ordinance." (Page 146, Sec. 280 of charter, as revised to May 17, 1916.)

The following is the charter provision of Denver relating to the introduction, publication and passage of ordinances:

> "* * * No ordinance shall be passed except by bill, and each bill, when introduced, shall be read at length, and shall not be so altered or amended as to change its original purpose. No ordinance shall take effect until published in some newspaper of general circulation published in the City and County, or in book or pamphlet form, by authority of the council. The manner of publication shall not be changed after the beginning of the fiscal year.
>
> No bill or resolution shall be passed until after the expiration of one week from and after the introduction of the same, nor until one publication thereof shall have been made. Any amendment altering the same shall be published in like manner before final action thereon. * * *" (Page 120, Sec. 216, Charter as revised to May 17, 1916.)

It is admitted by the appellee in the bill of complaint that the ordinance was passed in accordance with the charter. And according to the bill of complaint it is admitted that the ordinances had been prepared by the Public Utilities Commission more than a month before its passage by the council (Record, page 76).

So, therefore, it is conceded that the people of Denver have by Charter the same plenary power, as the State Legislature would have. It follows that

the people of Denver, by its Charter, had the right to provide that ordinances might be submitted to the Council for its passage, or in the alternative be submitted to the people for their vote. But counsel say that the Council passed the ordinance because and solely because it was submitted to the Council by petition, and seem to abhor the idea that 5,593 signers of the petition, not officers of the city, *but irresponsible members of the general electorate,* should be able to demand that an ordinance of this character be passed; but the submission of the petition by this "irresponsible electorate" amounted at least to the introduction of a bill. It did not become a law until either the Council in its judgment saw fit to pass it or until upon its refusal to pass it, it was voted upon by the whole "irresponsible electorate," and the ordinance having been passed in the manner provided by the Charter, and in no manner obnoxious to the Federal or State Constitutions, it became a law, and as to what was in the minds of the members of the Council when they passed the law, or as to what their supposed duties were in respect to the law, the courts are not at liberty to inquire. Their motives and reasons for passing a law, certainly cannot be inquired into by the judiciary; neither is there any evidence in this record, or counsel's contributions to the record, tending to show that the ordinance was passed with any other than honest motives.

It should also be borne in mind that the Assignments of Cross-Error of the appellee are strictly limited and are stated by the appellee to be intended to take effect only in the event that the appellant succeeds in overthrowing the report of the Master. The

appellee indeed throughout this brief has been urging with great show of earnestness that the Master's findings are incontestable and indisputable, and yet the whole discussion of the passage of the rate making ordinance is a direct attack upon the Master's very first conclusion of law. Under the circumstances it cannot be doubted that what appellee has to say on this branch of the case is used purely for its psychological effect.

It is contrary to our form of government for the judiciary to question the motives of the legislative branch of the government, or to inquire into legislative bodies' means of knowledge in passing a law when it has power to act.

In the case of Chesapeake and Potomac Tel. Co. vs. Manning, 186 U. S., 238, Mr. Justice Brewer thus states the rule at page 245 of the opinion:

> "But it is well settled that the courts always presume that the legislature acts advisedly and with full knowledge of the situation. Such knowledge can be acquired in other ways than by the formal investigation of a committee, and courts cannot inquire how the legislature obtained its knowledge. They must accept its action as that of a body having full power to act, and only acting when it has acquired sufficient information to justify its action."

In the case of Soon Hing vs. Crowley, 113 U. S., at page 710, this court held that the motive of legislatures, except as disclosed on the face of the acts, will not be inquired into by the Court. There is an

exception, however, to the rule as laid down by Judge Brewer, and that is in a case where the penalties for disobedience are by fines so enormous and imprisonment so severe as to intimidate the company and its officers from resorting to the courts to test the validity of the legislation.

See Ex-parte Young, 209 U. S. 123, 147.

In the Young case just referred to a statute had been passed by the Legislature of the State of Minnesota reducing the rates of a railroad company. The penalty for violation of the act was a fine not exceeding $5,000 or imprisonment in the state prison not exceeding five years, or both such fine and imprisonment. In the present case the penalty fixed by the ordinance was a fine of not less than one hundred nor more than three hundred dollars (Record, page 90). And in the State of Colorado an action to enforce a penal ordinance is not in the nature of a criminal action, but a suit to recover the penalty imposed thereby, which is in the nature of a civil action, and the penalty is not so enormous as to intimidate the company and its officers from resorting to the courts, as was said in the Young case.

> "The validity of legislation can never be made to depend on the motives which have secured its adoption, whether these be public or personal, honest or corrupt. There is ample reason for this in the fact that the people have set no authority over the legislators with jurisdiction to inquire into their conduct, and to judge what have been their purposes in the pretended discharge of the legislative trust. This is a jurisdiction

which they have reserved to themselves exclusively and they have appointed frequent elections as the occasions and the means for bringing these agents to account. A further reason is, that to make legislation depend upon motives would render all statute law uncertain and the rule which should allow it could not logically stop short of permitting a similar inquiry into the motives of those who passed judgment. Therefore the courts do not permit a question of improper legislative motives to be raised, but they will in every instance assume that the motives were public and befitting the situation."

(Cooley's Principles of Constitutional Law, page 172.)
Citing Ex-Parte McCardle, 7 Wall, 506.
Doyle vs. Insurance Company 94 U. S. 535.

Judge Cooley also in speaking of the power of courts to review legislative action says:

"They (the courts), also assume that the Legislature had before it any evidence necessary to enable it to take the action it did take."

Cooley on Principles of Constitutional Law, page 173.

Dillon in his work on "Municipal Corporations," Fifth Edition, Volume 3, at page 2254, says:

"*Whether the rate fixed deprives or will deprive* the company of its property

> without just compensation is a question to determined by the Court upon an *original independent investigation*, and not by an examination of the proceedings of the body fixing the rate to ascertain what evidence it received and acted upon, and whether that evidence was sufficient to justify the conclusion reached."

In Spring Valley Water Co. vs. San Francisco (C. C.) 124 Fed., 574, Judge Morrow has this to say on this question at page 584:

> "It is not the province of the Court to review the evidence upon which the board of supervisors acted in adopting the ordinance under consideration. Whether the ordinance deprives the complainant of its property without due process of law, denies to it the equal protection of the laws, or abridges the privileges and immunities of the complainant, are questions to be determined by the Court in this action upon an original independent investigation, and not by an examination of the proceedings of the board to ascertain what evidence it received and acted upon, and whether that evidence was sufficient to justify the conclusion reached,"

and in a case between the same parties, reported in 165 Fed. at page 657, Judge Farrington of the District Court, quoted with approval the language of Judge Morrow in the 124th Fed.

Counsel in their brief cite two cases which hold that a city council cannot fix rates without giving the

utility an opportunity to be heard: One case is the Agua Pura Company vs. Mayor, 10 New Mex., 6; the other is the Cleveland Gas, Light & Coke Co. vs. City of Cleveland, 71 Fed., 614. In the two cases just referred to the respective courts held that city councils could not fix rates for the municipalities that they represented for the reason that in effect it would be fixing rates by one of the parties interested in them, but these opinions have no support.

The case of Knoxville vs. Knoxville Water Company, 107 Tennessee, 647, was a case involving the right of the City Council to fix water rates, and the Court, after referring to the opinion of Mr. Justice Jackson in the Cleveland case, supra, on page 688 says:

> "But the fallacy, as we think, in this argument lies in the fact that the question of the reasonableness or unreasonableness of the rates is always open to judicial investigation, and while it may safely be said that the Legislature cannot constitutionally delegate the power to fix prices at which water shall be sold in a city by the authorities of the city, which is itself a consumer, either in its municipal capacity or through its inhabitants, without liability to a judicial investigation of the reasonableness of the rates fixed by such authorities. Still, if no such provision is made in an ordinance, the law will imply one and preserve to the Company its right to litigate the question upon that ground. We do not think it necessary that the provision be incorporated in

> the contract or in the ordinance, but it will be implied when not expressly provided for."

The last case referred to was taken to the Supreme Court of the United States, and is reported in 189 U. S. page 434, and the decision of the lower court was upheld. When the case reached this Court all of the questions raised in the Court below were not discussed by Mr. Justice Holmes, who rendered the opinion, but the ordinance was held to be valid, and the decision of the State Court was thereby confirmed.

After the decision of this case by this Court, another case was tried between the same parties, in the Federal Court. An injunction having been sustained by the Court below, an appeal was taken to this Court and reported in 212 U. S., page 1, this Court, on page 6 of the opinion saying:

> "The bill contained many allegations, which have become immaterial by the decision of this Court in *Knoxville Water Co. vs. Knoxville,* 189 U. S., 434, in which the validity of the ordinance was sustained, except so far as it might confiscate the property of the company by fixing rates so low as to have that effect. The latter contention alone was left open to the company, and to it the remainder of the bill is mainly directed"

and on page 7 this Court held that the function of rate making is purely legislative, whether exercised by the Legislature or a subordinate body, in the following language:

"At the threshold of the consideration of the case the attitude of this court to the facts found below should be defined. Here are findings of fact by a Master confirmed by the Court. The company contends that under these circumstances the findings are conclusive in this court, unless they are without support in the evidence or were made under the influence of erroneous views of law. We need not stop to consider what the effect of such findings would be in an ordinary suit in equity. The purpose of this suit is to arrest the operation of a law on the ground that it is void and of no effect. It happens that in this particular case it is not an act of the legislature that is attacked, but an ordinance of a municipality. Nevertheless the function of rate-making is purely legislative in its character, and this is true, whether it is exercised directly by the legislature itself or by some subordinate or administrative body, to whom the power of fixing rates in detail has been delegated. The completed act derives its authority from the legislature and must be regarded as an exercise of the legislative power." (See also Prentiss vs. Southern Ry. Co., 211 U. S. 210, 226, 227).

McQuillin on "Municipal Corporations," Vol. 4, Section 1743, says:

"The fact that the municipality which fixes the rates is not an impartial tribunal

> because it is interested in the rates, either in its municipal capacity or through its inhabitants, does not preclude the power of the legislature to delegate to a municipality the authority to regulate the rates of public service companies doing business within its limits."

There is little reasoning to support the theory that a City Council cannot fix rates for the reason that it is passing on its own case. The same reasoning would apply to the courts when rates of a public utility are fixed within their jurisdiction. It is not presumed that a public official, for the reason that he might have a private interest in the subject matter of a question by him to be determined, would not lay aside any partisanship or selfish interest that he might have and determine the question according to his sworn duty; and to say that before a City Council can pass an ordinance, fixing rates, it must give to the parties concerned a right to a full hearing, would be in effect to deprive such council of the right to fix rates at all. Take this case as an example. Counsel state that it took nine months to try the case before the Master, and if the Council had to provide such hearings in order to exercise its rate-making functions, it would be impossible to fix rates.

Counsel have cited a large number of authorities under this subject which we have examined critically, but none of them, except the New Mexico case and the Cleveland case, supra, bears out their contentions. It therefore follows that a city council, if given the power through the Charter of the municipality, has the power to fix rates of public utility

companies, and when they have fixed such rates, the courts will conclusively presume that the legislative body was actuated by proper motives and that its investigations was sufficient to entitle it to act.

There are two kinds of presumptions to be considered, which counsel seem to confuse. The first presumption is that the legislative body acts advisedly and with full knowledge of the situation. This presumption is conclusive on the courts, and not to recognize it would be an invasion by one co-ordinate branch of the government of the functions of another. The other presumption is that when a legislative body has acted with reference to fixing rates, the rates by it fixed are fair and reasonable, and are not confiscatory of property. This last presumption may be rebutted, and if the evidence is sufficient to satisfy the conscience of the court and the requirements of law, the court may set aside or hold void the act of the legislature, notwithstanding this presumption.

The third proposition for which appellee contends seems to be this: That the fact that the ordinance might have been submitted to the people for a vote, although as a matter of fact it was not, renders the ordinance void. The argument of appellee, so far as we can analyze it, seems to amount to this: That the City Council, although having the power of reasoning, failed to exercise that power, and without thought and without consideration and without a hearing, being a corrupt and wicked body, passed the ordinance. It is next contended that had the City Council in the exercise of its wisdom refused to pass the ordinance and submitted it to the people, the people being not only wicked and corrupt, but without

the power of reasoning, would without thought, without consideration and without a hearing have passed the ordinance in question, which would have made it just twice as void as though the City Council had passed it.

In the first place the whole question as to the validity of an initiated measure is a moot question, for, as a matter of fact, the City Council passed the ordinance and the same never was submitted to the people and no one could know what the people would have done with it had it been submitted to them. As we have pointed out, the court will not inquire into the motives of a legislative body in passing an act, nor into the qualifications of that body to judge of the propriety of the act; these questions are foreclosed and it must accordingly be assumed that the council passed the act because the members thereof thought it ought to be passed; indeed, reasoning in the fashion that ordinary human beings reason who are not tangled and tied up in the meshes of rules of artificial logic, it would not be at all surprising had the council considered that this Water Company, deprived of its franchise as it was and with no place where it could "market its product" at anything like the price that it had previously been able to obtain, would secure all it was entitled to if they gave it more than anybody else would give for its services.

We do not care to discuss at length this moot question of the validity of the initiative which appellee raises. Certainly the argument of appellee takes an extraordinary turn and evidences great peculiarity of mental process. Since the foundation of the Republic, it has been one of the principles of our organic law that certain rights are reserved to the

people, and that there are certain matters of fundamental importance on which the people of the sovereign State alone ought to pass. Thus a change in the organic law is considered to be of such high importance that the people of the State should have an opportunity of expressing themselves directly and not through representatives upon the question involved. Appellee informs us that there is another class of legislative duties of such character that they cannot be performed by the people, but must be performed by a legislative body whom the people shall select, and unless such duties are performed by that legislative body any action which may be taken will be void and unconstitutional. Can it be possible that the affairs of this Water Company are of more importance than an amendment to the Constitution of the United States? We should say not, and yet it is contended that a rate making ordinance passed in the fashion that an amendment to the Constitution would be passed would be *ipso facto* unconstitutional and void.

In support of the unique contention which it advances, appellee cites at pages 72 and 74 of its brief two Texas cases. These cases rest upon certain provisions of the Charter of the City of Dallas, which provided a particular form of procedure for rate making, and the Court held that this form of procedure must be followed and that any attempt to pass a rate making ordinance by initiation was void, because it did not conform with the Charter provision. The two cases are accompanied by a third case decided at the same time—Ex parte Farnsworth, 135 S. W. 535, which appellee does not cite. This case holds that the initiative and referendum are uncon-

stitutional because they are inconsistent with the constitutional guaranty of a Republican form of government; and the reasoning of this case permeates the other two. All three of these cases precede the decision of this Court, holding that such matters are not justiciable. In view of this fact we submit that the cases are not authorities at all, and that the Texas court would have never rendered the decisions had this Court passed upon the initiative and referendum previous to the time the Texas decisions were rendered. But, as we have already said, this entire discussion is the discussion of a moot question. The people of the City and County of Denver did not pass the rate making ordinance. The City Council did pass the rate making ordinance. Questions as to the motive of the City Council and as to the evidence upon which it based its judgment in passing the ordinance are foreclosed. The whole argument of appellee in this regard, aside from the mere psychological and moral effect which undoubtedly appellee hopes it may have, is a skillful endeavor to shift the burden of proof from its own shoulders to the shoulders of appellant. The appellee repeatedly and continuously asserts that the Master's findings are final; and it should not now be permitted to escape assuming the burden of proof required, and presenting to the Court evidence clear and convincing that its fundamental rights are being invaded and that the rates provided in the ordinance are confiscatory.

WHAT MUST THE RATES YIELD UNDER AN ORDINANCE TO ESCAPE THE CHARGE OF CONFISCATION?

Commencing on page 108 of appellee's brief, severel pages are devoted to a discussion of principles which it is claimed are well settled, and which we admit are well settled. Counsel say that appellant's contentions are that any net return, no matter how small, in excess of the actual cost of conducting the business, is sufficient to escape the charge of confiscation. We have nowhere made such a statement. We have recognized the rule and again assert it that a public service company is entitled to a fair return on the fair value of its property, provided the rate of return does not exceed the value of the service to the public. True we have cited cases, for the purpose of showing the development of the law on this subject, which have been less liberal with utility companies than the rule which is recognized by other courts. It must be remembered, however, that the courts do not make the rates; that they do not substitute their judgment for that of the rate-making body, and it is only in cases where it is manifest the rate fixed by the rate-making body will yield a return less than a fair return that courts will exercise their prerogative of disturbing the rate.

As to the authorities cited on the pages following page 108 of appellee's brief upon the question of the fair rate of return to be allowed to a public service corporation, we have no contention with counsel. We recognize the right of the Court to pass upon the act of a legislative body and if the result of the act

of the legislative body has been that the property of a utility company has been taken or that a just return has not been provided for the property employed by the company for a public service, then the courts have the undoubted right to set aside the act of the legislative body; and the fact that the court does have the right to pass upon the question, and the fact that there is no law in Colorado or in the Charter of the City and County of Denver or in the ordinance which made this reduction to the effect that the rate thus made is final and conclusive affords the complainant a remedy and affords it due process of law.

Fair Value of Service to Consumer.

It was held in the case of Smith vs. Ames, 169 U. S. 466, that what the company is entitled to ask is a fair return upon the value of the property it employs for the public convenience, but that on the other hand what the *public* is entitled to demand is that no more be exacted from it for the use of a public highway than the services rendered by it are reasonably worth.

Mr. Dillon in his work on Municipal Corporations, 5th Edition, pages 2266-2267, says:

> "The corporation is not compelled at the outset to enter into the undertaking. It must enter, if at all, subject to the contingencies of the business and subject to the rule that its rates must not exceed the value of the services rendered to its consumers. It has accepted valuable franchies granted by the State,—franchises

which are ordinarily exclusive for the time being—franchises which ordinarily debar the public from serving themselves satisfactorily in any other way, and in return, it must perform the duties to the public which it has voluntarily assumed at rates not exceeding the value of the services to the public taken as individuals, and irrespective of the remuneration which it may itself receive. On the other hand, it is argued that a rate which is founded upon the intrinsic value of the services in themselves may result in an excessive profit or return to the corporation, and in the payment of dividends which exceed the reasonable expectations of the incorporators. Under such circumstances, again, the rights of the public must be regarded as superior to those of the corporation. A reasonable rate to the public cannot be higher than the services in themselves are worth to the public; but this does not necessarily mean that a public service corporation is entitled to charge as a reasonable rate the full worth of the services to the public. If the attendant results of such a charge are to confer upon the corporation more than a fair return upon the value of the property used for the public at the time it is being used, that fact is sufficient to make the cost of the services to the public more than a reasonable rate and the corporation can only charge such lesser rate as yields a fair return to it for the use of its property;'' Citing:

Brunswick & T. Water Dist. vs. Main Water Co. 99 Me. 371.
Smyth vs. Ames, 169 U. S. 466.
Covington & L. Turnpike R. Co. vs. Sanford, 164 U. S. 578.
Chicago, M. & St. P. R. Co. vs. Minnesota, 134 U. S. 418.
Cotting vs. Kansas City Stock Yards Co. 183 U. S. 79.

Testing the fair rate of return by the value of the services to Denver and its inhabitants, let us for a moment examine this case:

The Water Company has no franchise. It obtained a franchise in 1890 which expired in 1910, and during that period of twenty years it adopted the system in use at the commencement of the period and added to said system in order to comply with the terms of its contract. The terms of this contract, both on the part of the city and the company, have been fulfilled, and the company is left with certain reservoirs, conduits and a distributing system, which it is now employing to furnish the city with water until such time as the city shall acquire or construct a new plant, and while the contractional rights of both parties have ceased to exist, there are certain obligations which the law enjoins; in other words, it is the duty of the Water Company to continue to furnish to the city water for a reasonable time. This obligation exists by reason of the necessities of the case; but what is the value of the service to the city and its inhabitants? The city has full power to condemn, at its reasonable value of course, the Water Com-

pany's plant. It has power to issue bonds for the purpose of paying for it, and the cost to the city in the event of taking such property would be the interest it would have to pay on its bonds which would not exceed 4½ per cent. Four and one-half per cent on $13,415,000.00 would be $603,000.00 per year, but if you subtract from $13,415,000.00 the item of going concern and the item of water rights, which the Master undoubtedly erred in adding to the value of the company's property, you have $10,610,000.00, the total value of the company's property; and at 4½ percent annually the amount that it would cost the city to pay interest on this total value would be an annual expense of $477,000.00, or $11,000.00 less than the Master found as the net revenue of the present company, under this ordinance.

Tested by this rule the service to the city and its inhabitants is only worth the amount it would cost the city to procure the service by exercising its right of condemning the property. Furthermore, it is not reasonable to suppose that the city if it purchased the plant or condemned it, would have to pay as much for operating expenses as is allowed by the Master. It would not have to pay $60,000.00 a year for executive officers, nor $30,000.00 a year in addition to what it does pay for legal expenses. It could get along without an expenditure of $32,000.00 for automobile and stable hire. It would have no taxes to pay because if it belonged to the city the system would be exempt from taxation, and thereby the cost of water to the city and its inhabitants would be materially reduced under the return provided by the ordinance.

Then considered from another angle, what does the Water Company consider its plant worth, and what does it consider is a fair return upon the money that it has invested? Counsel in their brief have contended that inasmuch as the legal rate of interest in Colorado is 8 percent, that, therefore 8 percent is a fair return upon its investment. Counsel evidently overlooked a statute in Colorado which provides that pawnbrokers shall not charge to exceed three percent per month, or 36 percent per year on money loaned by them; but to show absolutely what the complainant is willing to accept for its money we will follow a reference made by appellee to a matter outside of the record. This is to the option referred to by them through which they are seeking to sell their system to the city. Counsel justified themselves in referring to this contract by alleging that in our motion to advance the case, we made reference to this contract, but they carried their argument beyond their attempted justification and endeavored to show that the officers of Denver by entering into this contract on behalf of the city considered the valuation as found by the Master a fair value of the property. The option contract referred to is not an agreement on the part of the City and County of Denver to purchase the property for the price and upon the terms mentioned therein, but is merely an offer to the city, giving it the right, upon determination of the case in this court, to purchase the property at the price fixed by the Master, from which may be deducted such sums, or items of value as this Court may find or determine should be so deducted from the foregoing valuation fixed by the Master. Had the officers of the city considered the amount

as found by the Master a reasonable price for the property involved, they would not have taken the case to the Supreme Court of the United States, but would have immediately submitted to the voters in Denver the question of issuing bonds for its purchase. It is further provided in this ~~opinion~~ Petition which appellee has referred to that it will take its pay in bonds of the City and County of Denver at par, bearing interest at the rate of 4½ percent per annum, and that such bonds may run for a period of not less than ten years, nor more than fifty years. In other words, it is willing to accept a return of 4½ percent on ($13,415,000.00) or the amount to which this sum may be reduced, notwithstanding its claim that its money is worth 8 percent. The appellee offered in 1907 to sell its plant to the city for cash or bonds bearing 4% interest (Record, p. 21). The people rejected the offer and the appellee tried to enforce it. Denver vs. N. Y. Trust Co., 229 U. S. 123). Thereby indicating that its money was worth 4%.

Were the Gross and Net Earnings Sufficiently Proven?

In appellant's former brief it is contended that the evidence with reference to the gross earnings and operating expenses and the resultant net earnings is not sufficiently shown to afford the Court a basis for determining what the net earnings are, or rather what they should be.

Counsel on page 116 of their brief say that they submit with confidence that every detail pertaining to gross earnings and the net return under the ordiance rate was shown by proof which was specific to

the most minute particular, and conclusive in every respect. Appellants' former brief controverted this and it is again controverted by this reply brief. While the record does go into particulars as to the amount of the gross earnings and as to the amount of the operating charges, it is not explained what the money was expended for. The witness Cheyne (page 346 of the record) was the witness relied upon by the complainant below to prove the operating expenses. He was a witness employed by the complainant; he obtained his information, upon which his opinion was based, from vouchers and other information furnished him by the company. He tabulated the conclusions thus arrived at and introduced them as exhibits, the same being Exhibit "A-56," Record, page 990; Exhibit "A-107," Record, page 1080; and Exhibit "A-108," Record, page 1080. Exhibit "A-56" is the exhibit we referred to in our former brief, and is a tabulation covering the years from 1895 to 1913, inclusive. This exhibit purports to give the operating expenses of the company for the years included, but the objection is that it doesn't state what the money was expended for. Exhibit "A-107" is a statement of the earnings for the year 1914, which was not included in the tabulation above referred to, but this is no more specific than the other tabulation. Exhibit "A-108" purports to give the cost of repairs charged to and included in the operating expenses for the five years, ending October 31, 1914. To illustrate: Exhibit "A-107" gives the cost of operating expenses for pumping works for the year 1914, $68,702.67, and Exhibit "A-108" gives the cost of repairs included in operating expenses as $16,226.21, leaving an amount of

$52,000.00 charged to pumping works, which is not attempted to be explained at all; nor is it explained what the repairs were; furthermore, the evidence is that of a witness who has obtained his knowledge solely from information furnished him by the complainant company.

Counsel say that the witness, Cheyne, while on the stand offered to produce certain vouchers, showing some of the charges for operating expenses, and also say that the defendants took advantage of this offer and made many such requests, all of which were promptly complied with, and to substantiate this statement refer to the record at pages 351, 352 and 801, but a reference to the record at the pages indicated by counsel fails to show that said vouchers were ever introduced, or that the witness, Cheyne, or any one else ever offered to introduce or furnish them. At page 801 of the record it is shown that by an agreement of counsel the Master was authorized to appoint an accountant to check the items set forth in the exhibits of the witness, Cheyne, and pursuant to this consent an accountant was appointed, who purports to have checked over the exhibits of witness, Cheyne. His evidence is found on page 1101 of the record, and the figures he checked over are for the years 1913 and 1914. He also made tabulations which were referred to as Exhibit "C" and Exhibit "D" (Record 1108-1109), the exhibits referred to in our former brief, being his tabulations for the years 1913 and 1914. The witness, Mitchell, had the same means of information as to the witness, Cheyne, it is therefore evident that the result of their tabulations would be the same, but it is not evident why they should

have made the same mistakes in adding up the items of the operating expenses for the two years in question. Both the witness, Cheyne and the witness, Mitchell, in adding up the items of operating expenses for 1913 found them to be $352,242.42, which was a mistake on the part of both of them of $30,892.76. The same remarkable coincidence is true with reference to the two witnesses' concurrence in the items of operating expenses for 1914. Here both witnesses agreed that the total operating expenses were $473,276.99 and in adding up the items making up this amount it is found that they were both mistaken in the same amount, viz: $31,834.40. There is another remarkable coincidence: The bill of complaint on page 69 of the Record alleges the financial operations of the complainant for the years 1908 to 1913. This complaint was sworn to on the 29th of April, 1914, months before either of the witnesses referred to had testified. The operating expenses for 1913 were alleged as $352,242.42, the same amount found by the two accountants, notwithstanding that they had both concurred in a mistake in addition of $30,892.76, and for the years 1908, 1909, 1910 and 1911, the allegations of the bill agreed with the totals of operating expenses of witness Cheyne, although the witness' additions for those years were in error more than $30,000 for each year. (Record p. 390, Exhibit "A-56," columns 3, 4, 5 and 6.)

Counsel say at page 121 of their brief that the result of Mr. Mitchell's examination of the vouchers was to verify in every respect the testimony and exhibits proffered by Mr. Cheyne. Yes they verified his figures so clearly that their mistakes agree, as

well as their computations, and both of them agreed with the allegations of the bill of complaint.

But counsel say that we didn't make reference to all of the testimony introduced with reference to operating expenses, but that many exhibits were introduced before the Master that are not contained in this record, this evidence being referred to at pages 117-120 of their brief, but we are not arguing here from counsel's contention as to matters *dehors* the record, but from the record as it is presented here. Whether or not their contentions are true with reference to these matters that they themselves did not see fit to incorporate in the record, we are unable to say, but in view of their uniformly cautious and comprehensive manner in exhausting every subject as indicated by their brief, we seriously doubt whether the exhibits referred to would have added anything further than is contained in the record before the Court.

But counsel also say that Mr. Metcalf, another of their experts, whose qualifications they modestly admit to be of the highest, made a forecast respecting like items for ensuing years, a horoscope as it were, which must have greatly aided the Master in determining what the operating expenses of the company would be in the future; and that the engineers appointed by the Public Utilities Commission, who had had free access to the company's records (but had never availed themselves of the opportunity), were of the opinion that the present rates and the rates in the past had been grossly inadequate, but we are not appealing from these voluntary opinions of this unofficial board of engineers whose report was rejected by the commission appointing it, but from

the judgment of the court below. There is nothing to show what investigation these engineers made, how they arrived at their conclusion, or what opportunities were afforded them for knowledge except that it appears by counsel's statement that the company offered them access to their records, but it is not shown that they ever availed themselves of this offer.

Counsel conclude this topic of their brief by saying that the case of Chicago, etc., Co. vs. Wellman, 143 U. S., 339, quoted on page 21 of appellant's original brief, is not in point as to the necessity of the company advising the Court as to what was done with the receipts and earnings of the company, for the reason that this was a friendly suit, the expenses were stipulated to, and both parties were anxious to reach the same result; but the fact that it was a friendly suit and that the operating expenses were agreed to, does not change the principle involved. In fact, the witness, Cheyne, and the witness, Mitchell, appointed by the Master, agreed as to expenses here. Before a court will set aside the act of a legislative body fixing rates, it must have before it *facts* which will authorize it to set aside the action, and whether those facts are insufficient on account of an agreement, or whether there is a failure to furnish them, it makes no difference in principle.

As stated by the Court in case of Knoxville vs. Water Company, 212 U. S., page 8:

> "The power is best safeguarded against abuse by preserving to this Court complete freedom in dealing with the facts of each case."

It was not intimated in the Wellman case that there was any fraud or collusion on the part of the parties, but the Court said on page 345:

> "We do not mean to insinuate aught against the actual management of the affairs of the company. The silence of the record gives us no information, and we have no knowledge outside thereof, and no suspicion of wrong."

Therefore, as to the principle involved, the Wellman case is clearly in point in this case. Justice demands that the fullest disclosure be made of all material facts in order that the Court may know whether or not the company by judicious management could make a reasonable profit upon its gross returns, and so far as any definite information to the Court is concerned, the evidence in the Wellman case was as full as it is in the present case. In the Wellman case it was agreed by counsel that a certain amount was the operating expenses of the company. In the present case it is contended on the one side that certain totals are the operating costs for pumping works, reservoirs, office expenses, stable expenses, etc., and the other side does not agree to this. The evidence on behalf of the complainant was wholly lacking, and this Court is not able to determine from it whether or not the money paid out for operating expenses was judiciously expended.

Should the Rates Have Been Submitted to a Practical Test?

Under this topic counsel in a labored effort endeavor to show that the appellant's contention that

the ordinance rates should be submitted to a practical test before holding them confiscatory is untenable.

Counsel refer to paragraph 18 of the bill and say that it is there alleged that the gross revenue will be no greater and the operating expenses no less in the future than in the past, and say that these allegations were not denied in the answer, and therefore stand confessed. A reference to the answer, page 104 of the Record, paragraph 18, will show that this allegation was denied and put in issue by the answer.

Counsel also state that in such an ordinance, where flat schedules of rates to the consumer are provided on the payment of a certain sum, it is obvious that increased consumption does not result in increased revenue; but it is not obvious. There were nearly 45,000 water users in Denver. Many of them, and probably the greater portion of them are those to whom payment of their water rents becomes a burden. More is charged by the company when baths are used than when they are not and when toilets are used. Many of the uses that are charged for in the schedules of the company are uses which become luxuries for people in moderate or straitened circumstances, and it is not obvious that a reduction of rate will not increase the use of water by people in Denver, and there will be a great increase in use and resultant increase in revenue without a proportionate increase in the volume of water necessary, and even if more water were drawn through the pipes than at present, how would that increase to any considerable amount the cost of operating expenses?

They wouldn't have to employ any more executive officers or pay out any more for automobile and stable hire; in other words, the overhead expenses would be the same, and most of the water being furnished by gravity, there would be practically nothing to add to the expense. It is therefore one of those cases that before it can be determined whether the rate, as reduced, is confiscatory, it is absolutely necessary to resort to a test. But counsel say that they did have an opportunity to determine, and that evidence was given of what net revenue the company received for six months after the ordinance went into effect. It is hard to see how the passage of the ordinance would afford a test as to what the result would be unless the ordinance were being obeyed. The test referred to by the courts is a test of the application of the law operating under the reduction that has been made; and where there is any doubt as to whether or not the rate is confiscatory the courts have invariably held that this test is necessary before resorting to the courts. It is very true, as stated by counsel, and borne out by the cases they have cited on page 128, et seq., of their brief, that where there is no doubt as to the reduction being confiscatory, then the courts will not wait to put the matter to a test when it is certain that the result of the test will not change the confiscatory character.

In the case of Knoxville vs. Water Company, 212 U. S., page 1, the Court at page 15, says:

> "In this case there could be no absolute certainty, because the ordinance had never been put in operation;"

and again at page 17:

> "Where the case rests, as it does here, not upon observation of the actual operation under the ordinance, but upon speculations as to its effect, based upon the operations of a prior fiscal year, we will not guess whether the substantial return certain to be earned would lack something of the return which would save the effect of the ordinance from confiscation. It is enough that the whole case leaves us in grave doubt. The valuation of the property was an estimate and is greatly disputed. The expense account was not agreed upon. The ordinance *had not actually been put into operation;*"

and concluding the opinion by saying, page 18:

> "If hereafter it shall appear, under the actual operation of the ordinance, that the returns allowed by it operate as a confiscation of property, nothing in this judgment will prevent another application to the courts of the United States or to the courts of the State of Tenessee."

The ordinance in the foregoing case was passed on March 30, 1901, and suit was filed December 7, 1901. The decision in the court below was based upon the operations of the fiscal year, ending March 31, 1901, and the Court says at page 15:

> "We think it was error to confine the investigation to, and base the judgment upon that year alone. The precise subject of inquiry was, what would be the effect

> of the ordinance in the future. The operations of the preceding fiscal year, or of any other past fiscal year, were valueless if the year was abnormal, and were only of significance so far as they foretold the future''

and, as shown by the record in this case, the year, 1914, was an abnormal year; the expenses of operation were higher, and the gross returns were lower than for any of the three years that preceded it, and this without taking into consideration the unsatisfactory character of the testimony.

Counsel quote from the case of Boyle vs. St. L. & S. F. R. Co., 244 U. S., 106, the following language:

> ''We agree with the District Judge that the two months of investigation afforded a basis of argument as to constant conditions''

and there is no doubt here that the evidence of the operating expenses for 1914 afforded a basis of argument and counsel have fully availed themselves of the opportunity afforded, but when it is taken into consideration that the year is the most unfavorable year that could have been selected, and that if the year 1913 or 1912 or 1911 had been taken instead and to this had been added the gradual average increase of the company's earnings in the past, amounting to at least 5 percent annually, the gross returns would have been very substantially higher than the basis the master took.

In the case of Wilcox vs. Consolidated Gas Company, 212 U. S., 19, the Court at page 42, after discussing the unsatisfactory nature of the *expert tes-*

timony, stated that where the rate complained of shows in any event a very narrow line of division between possible confiscation and proper regulation, "and the decision depends upon opinions as to value, which differ considerably among the witnesses, and also upon the results in the future of operating under the rate objected to so that the material fact of value is left in much doubt, a court of equity ought not to interfere by injunction *before a fair trial has been made of continuing the business under that rate,* and thus eliminating, as far as is possible, the doubt arising from opinions as opposed to facts" (Italics ours). and again on page 51 of the opinion says:

> "The question of how much an increased consumption under a less rate will increase the earnings of complainant, if at all, at a cost not proportioned to the former cost, can be answered only by a practical test. In such a case as this, where the other data upon which the computation of the rate of return must be based, are from the evidence so uncertain, and where the margin between possible confiscation and valid regulation is so narrow we cannot say there is no fair or just doubt about the truth of the allegation that the rates are insufficient."

Exhibit C page 39 gives a summary of the population of Denver during the period that the Company has operated, the number of taps and the per capita consumption. It is apparent from this table that the population of Denver has steadily increased. In 1876 this population was 17,000; in 1880, 35,662; in 1885, 76,000; in 1895, 116,000; in 1900, 140,000; in

1905, 175,000; in 1910, 220,000 and in 1913, the last year given in the table, 242,000. Thus it is apparent that on the average of the entire period, the population of Denver has increased in excess of 6,000 per year, and the last three years has show an increase in 1913 over 1912 of 7,000; an increase in 1912 over 1911 of 5,000; an increase in 1911 over 1910 of 10,000. The number of taps has increased at about the same ratio. It is asserted by appellee that, inasmuch as consumers take water under a flat rate and are entitled if they pay these rates to take all the water needed during the period for which payment is made, an increase in the consumption does not make an increase in revenue. So far as the individual consumer is concerned this matter has already been discussed, but an increase in the number of consumers certainly results in an increased revenue to the Company.

On the other hand, if the consumer cuts down his consumption of water, unquestionably the Company is able to furnish service cheaper, and it is apparent that from the period beginning with 1895 down to the present time, the per capita consumption of water has gradually, but steadily decreased. This is best shown by taking the average of the periods. From 1895 to 1899, both inclusive, the average consumption of water per capita was 224 gallons per day; from 1905 to 1909, it was 212 gallons per capita per day. For the four years from 1910 to 1913, it was 202 gallons per capita per day. This decrease is explained, of course, by the situation common to every city in the country; the increased density of population resulting from an increased number of inhabitants and from the rise in popularity of apartment houses and

hotels as dwelling places, as such institutions require much less water for irrigation than do private residences.

This Ordinance complained of was not enacted for the year 1914 alone; it was made for the future, and while in the first two or three years of its operation the revenue rate might not be so large as the Company desires and might even be held to be less than was proper, still, it would undoubtedly increase and increase substantially as time went on by virtue of the increase in the number of consumers, and the fact that each consumer is, on the average, using less water every year. It should be borne in mind that the testimony throughout the record tends to show that the present plant is adequate for many years to come, without the addition of further units.

Gross Revenue.

The Master in his report, basing his estimate on the fiscal year, ending October 1, 1914, found that the gross earnings, if the reduction were made as provided by the ordinance, would be $1,093,615.45.

At page 93 of the opening brief appellants claimed that the gross earnings of the company for the year 1914, as shown by the testimony of complainant, was $47,067.30 less than for the year 1913, and $48,341.66 less than for the year 1912. Counsel say that this statement is absolutely untrue.

The total gross earnings given by the witness, Mitchell for the year ended October 31, 1913, were $1,382,703.96, (Record, page 1108), and the total gross earnings given by the same witness for the year ended, October 31, 1914, were $1,335,636.09. For 1912

the gross earnings, referring to Exhibit "A-56," column 2, are given by the witness, Cheyne as $1,383,-977.75; thus verifying appellant's former statement. Counsel admit after numerous calculations that the gross earnings for 1914 were $30,879.68 less than for 1913, and $45,182.25 less than for 1912, thereby contradicting their witness Cheyne; but they say that they equalled those for 1911, and exceeded those for any previous year in the company's history. In 1911, while appellee's statement is no doubt true as to the total gross earnings, the operating expenses were only, according to their own statement, $325,053.53, (Exhibit "A-56" Record, page 990), or $33,472.31 less than for 1914, (Record, page 1111).

The foregoing reference to the gross earnings included the ranch income, but it includes it for all of the years mentioned, 1914, as well as 1913, 1912 and 1911, and in view of the fact that a part of the operating expenses went to the maintenance of the ranch and no attempt was made to segregate the expenses of the ranch from the general operating expenses given, there is no way in the record to separate this ranch income, and our reference was only a comparative reference.

Counsel endeavor to explain the difference of the income for 1912 and 1913 by saying that in 1914 there were delinquent license payments, amounting to $37,619.70 as compared with $6,152.55 at the end of the year 1913, and that the latter amount was about the normal of such delinquencies, and state that therefore in order to make a just comparison that the difference in these two delinquencies, viz: $31,467.15, must be added to the gross earnings for

1914. But the Master didn't do this. Had the Master taken as a basis the gross earnings of 1913, together with the natural increase, which is no less than five percent per year, there would be no complaint, but out of the last four years he took the year where the earnings were the least and the expenses were the greatest.

After counsel's fruitless endeavor to show that the record has been misrepresented with reference to the operating expenses for the years 1914, 1913 and 1912, they resort to their usual haven of refuge and refer to exhibits not contained in this record, and again conclude this topic by saying that Mr. Mitchell by his testimony and his report sustain in every particular the facts shown by complainant's exhibits.

Counsel on page 136 of their brief refer to the allegations of the complaint wherein it is alleged that the operating expenses would be $333,045.06, whereas, the Master found the expenses to be $347,-845.00, and explain the difference by saying that the bill was filed at the time when of course the actual facts could not be known; but if the company were willing to positively allege the amount referred to being familiar as it must have been with the operation of its affairs, not only as of the time of the filing of the bill, but for years preceding such time, isn't it fair to say that this illustrates the unreliability of taking the year 1914 alone as the basis for determining what the expenses for the future would be and also illustrates the necessity of a test. In addition to the finding by the Master of the amount of the operating expenses, counsel state that the witnesses all agreed that a much larger allowance than that made

by the Master would be reasonable, (page 137, appellee's brief), and refer to the evidence of Mr. Freeman, the engineer that has had such a vast amount of experience (in testifying on behalf of public corporations), wherein he states that he *believes* that the sum of $350,000.00 a year would be a fair allowance for operating expenses. Mr. Holman, another witness, also testified that from his experience in operating water works, he would *want to spend* at least $400,000.00 a year, and Mr. Hazen's judgment was that $350,000.00 a year with an additional contingent amount of from $20,000.00 to $100,000.00 a year should be allowed for operating expenses. Fortunately for the city, however, these witnesses were not the Court or Master below, but were simply witnesses; but they should have testified to the facts from which the Master could have drawn the conclusion, rather than to have drawn the conclusions themselves and stated them to the Master.

On page 139 of appellee's brief they state that the Exhibits "C" and "D" referred to at pages 97 to 100 of appellant's brief, are not the exhibits of appellee, but of appellants, and that they were prepared by defendant's expert accountant witness, Mr. Mitchell. Counsel have previously stated that this witness, Mitchell, was appointed by the Court for the purpose of checking up the report of the witness, Cheyne, and this former statement of theirs is borne out by the record, (Record, page 1101), and it has heretofore been pointed out that the evidence of the witness, Cheyne and the witness, Mitchell, have coincided so closely, even to the extent of the two witnesses having made the same mistakes in addition, that there is a grave suspicion as to the re-

liability of either witness's testimony, and there is no other evidence in the record except of these two witnesses as to the operating expenses.

Counsel in replying to appellant's criticism at page 139 of their brief say that the statement with reference to pumping works that no explanation is given as to why this cost is greater in 1914 than in preceding years "is untrue," and we find that we overlooked the reference in the record referred to, but counsel do not yet, and neither does the record, show what the $68,000.00, which is charged for pumping works, was used for in 1914, nor how the equivalent charge was used for any of the other years. As to the item of reservoirs, there is nothing in the record as to what these repairs consisted of, and as to whether they consisted of repairs which were equivalent to renewals; and the Exhibit referred to, "A-107," (Record, page 1080) gives no information whatever on the subject, but simply under the head of "operating expenses and taxes," the item of "reservoirs" is put down as $42,700.46. The same criticism applies to the showing of expenses for the other items contained in Exhibit "A-56" and Exhibit "A-107."

Counsel take the astounding position that they have a right to charge to "operating expenses" attorney's fees and other expenses of litigation incurred in the endeavor to set aside this rate. In other words, that if a city feels that rates being charged it by public utility companies are too high and therefore seeks to reduce them, the companies can by employing enough lawyers and enough high priced expert witnesses make their operating expenses so

high that the ordinance will become confiscatory even though it wasn't before the attorneys and witnesses were employed. Such a rule would be a dangerous one; it would be too much of an invitation to public utility companies, naturally desirous of receiving as high rates as possible, to contest any reduction if the result of the contest would have to be paid by the public.

Counsel state on page 143 of their brief that it is proper that operating expenses, should include cost of repairs and ordinary maintenance. This is not questioned. They state that on the other hand, replacements are properly chargeable to depreciation, which is also true, and state that the evidence before the Master clearly demonstrated that the operating expenses contained no charges for replacements, betterments or extensions, and refer to Exhibit "A-107" and Exhibit "A-108," Record page 1080, in support thereof. As stated before, Exhibit "A-107" does not show what one penny of the amount set opposite the items was expended for, except that they have divided up the operating expenses into pumping works, reservoirs, conduits, etc., Exhibit "A-108" shows what part of the amounts set opposite the various items under the head of "operating expenses" were charged to cost of repairs, but the proportion of the entire amount charged is very small in each instance, and this does not show the character of the repairs, or as to whether the repairs were so permanent in character that they should have been charged to "depreciation," or whether they were properly charged to "operating expenses."

DEPRECIATION.

Let us here correct an error in printing on page 86 of our original brief. We intended to say one and three-fourths percent of the present value (not revenue) of the plant.

In stating his conclusions on this important item of depreciation, the Master expresses himself as follows:

> "The allowance of one hundred forty thousand dollars for annual depreciation is based largely on the testimony of Mr. Hazen, who estimated such depreciation at one hundred fifty thousand dollars. His estimate was based on a higher appraisement of the plant then mine" (Record, page 139).

It therefore becomes interesting to examine the testimony of the witness, Hazen, on this point. This testimony is found at page 230 of the Record, where he says:

> "I estimate that a fair allowance for depreciation on the property today is one hundred fifty thousand dollars per annum. In 1907-8-9, the Board of Appraisers estimated the depreciation at one hundred thirty-five thousand dollars per annum. The estimate of one hundred fifty thousand dollars is for straight depreciation with no allowance for contingencies. It is the sum set aside to make good the loss from wear and tear from all causes other than those that are taken care of by ordinary maintenance, repairs, etc."

Of course this item allowed for depreciation and charged as a part of the annual operating expenses of the Company must be based on an estimate of the life of the plant, and must be placed at such an amount that this annual allowance (the estimate being made either on the sinking fund theory or a straight line depreciation), will provide at the end of the estimated life of the plant a fund equal to the plant's value, less the value of those units which by their very nature cannot depreciate in value and less the junk value of what may be left.

In our former brief at page 86, we stated that it seemed reasonable to say that the estimated life of the units, taking the average, will be fifty years from May 1, 1914. The appellee at page 147 of its brief criticises this statement of ours and alleges that the testimony shows "quite the contrary." It is not pointed out wherein our estimate is wrong, nor is any attempt made by the appellee to place an estimate what this future life may be. Such a matter cannot be determined accurately in advance; it is all a matter of judgment and we based our statement in this regard largely on the fact that the future life of the expensive elements of the Company's plant was shown in Exhibit "C," at page 65, et seq., to be at least eighty-four years from 1914, and the further statement of the witness, Metcalf (Record, page 295), that in many cases his estimates of the useful life of certain elements of the plant had already been shown to be too low. In the absence of any aid or suggestion from the appellee on this point, we renew our assertions that it is fair to estimate that the average life of the plant would be at least fifty years from 1914.

This being so, we submit with fullest confidence in the correctness of our position that the estimated yearly future depreciation allowed by the Master is grossly excessive and that on this account the Master's determination of net earnings is far too low.

The appellee attempts to explain the great disparity between the past depreciation fixed by the Master and that found to be the depreciation for the year 1914 (our original brief, page 87), by stating that that disparity is explained by the fact that the determined depreciation for the past does not include property which amounts in value to $1,261,000.00 abandoned as obsolescent or otherwise useless in serving Denver, while for the future a depreciation allowance ought to be made for property of this character which will soon be abandoned or become obsolescent.

Of what does this property abandoned in the past consist? Exhibit "C," page 98 to 100 gives a resume of this abandoned property and an examination of this exhibit shows clearly that such property consists of large units given up principally for the reason that they were found not to be practical installations, or because they had been superseded by the larger units of the plant at present used. For example, the first group consists of various pumping stations:—the old Fifteenth Street Station; the Beaver Brook Station, both of which were entirely abandoned and their places taken by the more modern gravity system. The Ashland Avenue plant was built on leased land, later it was dismantled, and a new plant built. Why that plant was abandoned is not shown clearly, but we assume that it was because it was impracticable to renew

the lease. Among the tanks and stand pipes, it appears that out of the four mentioned, all, save one, have been abandoned and that this one has been removed to University Park, a distant suburb of the city. Among the reservoirs, the Strong Reservoir was abandoned because the Cheesman site was considered more advantageous; the Skelton Reservoir was abandoned, because it was submerged by the construction of the Marston Lake Reservoir; the Highland Reservoir was abandoned and no explanation is given, but we assume that it was because the water was furnished in some more satisfactory way by new works installed by the Company.

There are two artesian wells which were abandoned, a variety of buildings were abandoned, including a hotel; various filter plants were abandoned; a submerged dam in Cherry Creek at Sullivan was abandoned; various privately owned telephone lines were abandoned (presumably because better telephone service could be procured from the public telephone lines).

In addition to these, certain conduits were abandoned and certain distributing pipes, but the total value of these conduits and pipes does not much exceed the sum of $200,000.00 and from this list it seems clear that very little was given up because it was worn out, but that the things which have been abandoned were engineering mistakes and that small units used in the early history of the Company were given up when larger or more efficient units were provided to take their places.

Sullivan Reservoir is a good illustration of the situation and shows to some extent why some of

the larger units such as above described have been abandoned. Even the omniscient Mr. Metcalf is puzzled regarding this structure and declares (Record, page 274), that he does not know what service this reservoir was originally designed to perform although he makes various guesses as to how it might be used. This reservoir, according to Mr. Metcalf's testimony, has already cost $190,000.00. The Master did not classify it as abandoned property, but did characterize it as property neither "used nor useful," so that, we repeat, the property which has been abandoned in the past has consisted almost entirely of small units displaced by more extensive and effective units or of the Company's engineering mistakes.

If it is true that the present plant is so ill conceived, so ill devised and such a patch-work that other extensive units thereof must shortly be abandoned, then the rate which the Master charged for future depreciation may be explained. Certainly it cannot be justified. On the other hand if such property is shortly to become useless, if it is to be abandoned, then it is outrageous to value such property at its reproduction cost, less only physical depreciation.

However, there is nothing in the record to show that large units of the Company's plant will need to be abandoned in the immediate or near future; the Master says in his report "Lake Cheesman delivers water to the city with small loss in transit; is sufficient as a source of domestic supply and is available for use and used in periods when the supply of water in the natural streams is limited and the demand for water great" (Record, page 130). He

further declares: "The evidence shows clearly that the Company's plant as a whole is in excellent condition. The quantity of water is abundantly in excess of the needs of the community; the pressure under which the water is furnished is good, comparing very favorably with the records in the larger of our American cities. In general, I believe that the service furnished by the Denver Union Water Company compares favorably with that furnished by other water works systems in the country" (Record, page 139).

This does not indicate that any considerable portion of the Company's plant will have to be abandoned in the near future; indeed it indicates quite a contrary condition, and certainly there is an immense volume of testimony in the record, testimony produced by the appellee, to the effect that the plant is not only in nearly perfect condition, but is ample for the needs of the community for many, many years to come.

As we have already suggested, all allowances for annual depreciation must certainly be based on some estimate regarding the number of years in which the amount shall be contributed, in order to make up the value of the plant. If the witness, Hazen, whose testimony was the Master's guide, had this principle in mind, he must have fixed the amount that was to be so replaced at $15,300,000.00, which was his estimate of the value of the Company's property (Record, page 230), and in order to provide for this large amount of money, he placed the annual depreciation allowance at $150,000.00. The Master, having estimated the total value of the property at a less amount than Mr. Hazen, reduced, rather

more than proportionately, the Hazen estimate for annual depreciation and made it $140,000 annually. But why should the Master, or Mr. Hazen, or any one else take the value of the Company's *entire* property as a basis for computing annual depreciation. The only property that should have been taken into consideration in determining this question is property that depreciates.

Referring to the Master's table 1 (Record, page 122), we find some items that cannot possibly be the subject of depreciation. The first is lands valued at $637,814.00. The next are water rights valued at $2,947,617.00; the next is going concern, valued at $800,000.00. Now *past* depreciation was not allowed by the Master on any one of these items. We are entirely unable to see why any of them could possibly depreciate in the future. The Master took the value of $13,415,899.00 as the basis for computing future depreciation, but in computing past depreciation he eliminated these three items of lands, water rights and going concern.

Assuming that all of the other items of the property were subject to depreciation, and deducting these three items of lands, water rights and going concern from the total valuation found by the Master, we have $9,030,468.00 as the total value of all the property which can possibly be subject to depreciation, and if the Master's estimate of $140,000.00 annual depreciation on his valuation of $13,400,000.00 is a fair estimate, then calculating the annual depreciation allowance in the same way, this item should be $90,000.00; $50,000.00 less than found by the Master, and the net returns as found by the Mas-

ter should be increased by this amount of $50,000.00 at least.

One hundred and forty thousand dollars found by the Master as properly allowable annual depreciation is an annual rate of 1.55 per cent on $9,030,468.00, the very highest valuation that could be placed on property subject to depreciation.

At page 145 of its brief, appellee refers to the evidence at pages 347, 348, 799 and 801 of the Record to support the Master's allowance for annual depreciation. The evidence referred to is that of the accountant Cheyne, but this witness did not purport even to make an estimate of annual depreciation, and on his cross-examination (Record, page 899), he says: "In using the figures $170,000.00 for depreciation and contingent reserve, I simply adopted the estimates of the Company's engineers."

The evidence of the witness, Metcalf, referred to in this connection, is to be found in the Record at page 896.

With all deference to the distinguished ability claimed for this witness by counsel for appellee, we declare that his testimony is more a partisan argument than a statement of evidentiary facts. He says that Mr. Fellows' annual depreciation allowance should be materially increased and that the depreciation allowance set forth in table C, is based on the sinking fund method as 95/100 of 1 per cent and the appellee in its brief at page 146, tells us that the engineers of the Public Utilities Commission applied the rate of 1 per cent to the gross reproduction cost or gross value. This is true only to the extent that $140,000.00 is practically 1 per cent of $13,415,000.00,

but to call this a depreciation allowance under the sinking fund method of 1 percent per annum is an entirely mistaken statement, for if the life of the plant is fifty years, the real situation is as shown in our opening brief (page 88). As we pointed out in our former brief at page 88, $140,000.00 paid in annually with interest at 4 per cent compounded annually will amount to $13,500,000.00 in about thirty-nine years and seven months, while $85,028.00 so paid in annually with interest at 4 per cent thereon compounded annually would amount to $13,500,000 in the fifty years which we have fairly estimated as the future life of the plant, but the allowance that ought to be made is an amount sufficient to yield $9,030,488 less the scrap value of the plant, rather than $13,-415,899.00; now $56,685.00 paid annually with interest at 4 per cent compounded annually will amount to $9,000,000 in fifty years.

The finding of the Master as to depreciation for the year 1914, and following years, is not reinforced by showing, as appellee has attempted to do, that the courts have in cases of gas companies, or that State Comissions have in cases of electrical companies made larger allowances for depreciation than was made by the Master here. It is absurd to contend that a water supply system, the principal elements of which consist of massive structures of masonry and durable iron pipe, both of which, even on the testimony of appellee's own witnesses, have a theoretical life of ninety-four years, and will probably last much longer, depreciates at the same rate as an electrical plant filled with delicate machinery which is constantly running. How skillfully Mr. Metcalf, appellee's expert witness, on whose testi-

mony the witness, Cheyne, relies in making his figures, has handled the situation for the Water Company can be seen from an examination of his testimony. When he values the plant of the Water Company for the purposes of obtaining its present valuation, he deducts accrued depreciation, basing his deduction, as he says, upon judgment and his observation of the property (Record, page 901). He declares that the property of the Company, upon actual examination, has depreciated far less than might have been expected, and when confronted by tables of theoretical depreciation which he had published, he makes the following statement (Record, page 294):

> "You imply that regardless of the condition or character of the machine a man must adopt a list of estimated ages which was made years ago with perhaps a certain set of conditions in mind, and that simply because that list has been so printed, therefore, regardless of the condition of the property, a man should always stick to the list.
>
> At West Denver Station, page 88, Exhibit "C," I gave the life of one set of boilers 23 years, another set 20. At Capitol Hill 24 years, at University Park Station 15 years, Montclair Booster Station 21 years. Ashland Avenue Station 21 years. The life tables give the average life of boilers at 12 to 16 years, many of these boilers are already older than that, still doing good service and still approved by the boiler insurance companies. I might say

that those tables were made when I was considerably younger and had had less experience than today. As I have stated, many of the structures in this plant are actually older than the useful life which I have given in the tables and yet are in excellent condition and destined to be in the service for many years to come. I conceive it to be the duty of the engineer to pass judgment in the light of conditions as he finds them, not in the light of any arbitrary tables, least of all to be bound by anything which he has written before, simply on account of a desire to be consistent with what he has written."

When, however, he comes to testify concerning future depreciation, he bases his judgment purely on the theoretical estimates which he says earlier in his testimony should not be controlling, and this is true, not only of Mr. Metcalf, but of all the engineers employed by the Company.

The witness ultimately states exactly what he has done in the following words (Record, page 894):

> "The extent of depreciation that has accrued, must be determined first and foremost by an actual inspection of the plant. In our depreciation allowance for the future, we based our estimate on the sinking fund method with a 4 *percent interest rate.*" (Italics ours.)

By this ingenious method of computation, Mr. Metcalf is able to testify that the various elements of the plant have depreciated up to the present time

a small fraction of 1 percent per year, based on their values as found, and that for the future they will depreciate at the rate of about one per cent per year, based on their reproduction cost. The discrepancy is not explained by the appellee and is evidently incapable of explanation.

IS EIGHT PER CENT PER ANNUM THE LEAST RATE OF NET RETURN, WHICH IN THIS CASE CAN ESCAPE THE CHARGE OF CONFISCATION?

In appellee's brief at page 158, et seq., it is contended that 8 percent is the least rate of net return that in this case would escape the charge of confiscation. It is also claimed that even taking as a rating base the lowest valuation which by any possibility could result from appellant's contentions, and applying thereto the net earnings under the ordinance, the resultant rate of return would be far below that which is repeatedly held necessary to escape the charge of confiscation. In arriving at this conclusion appellee assumes that the net return of $488,820 found by the Master is fixed and established.

At page 162 of appellee's brief the rating base, deducting from the Master's report the items of water rights, going value, engineering and contingencies and interest during construction is calculated at $9,005,321. This calculation as made by appellee is correct; in our previous computation of interest during construction and enginering and contingencies, we neglected to deduct the Master's finding of accrued depreciation. Appellee says that measured by this rating base, the net annual return

would be .054. As said before, however, this is on the assumption that the finding by the Master of the net return is $488,820.00.

As heretofore pointed out, the year taken by the Master, namely, 1914, was an abnormally low year. The gross revenues for that year were from $45,000 to $47,000 less than for 1912 and 1913, and the operating expenses were considerably higher than they had been during the whole life of the company. Furthermore, the Master allowed $140,000 for depreciation and the only evidence in the case upon which to base a conclusion as to depreciation was the arbitrary allowance of 1 per cent and less, but the Master not only included property which is the subject of depreciation, but also over $4,000,000 of property that he had expressly held was not subject to depreciation (Record, page 122), thus his allowance for depreciation was at least $50,000 too high. Add this sum to the $50,000 difference between 1914 and a normal year and we have $100,000 that should be added to the Master's estimate of annual net return, or $588,820, and this is not taking into consideration the gradual increased revenue of the company which would reasonably be expected, an increase of 5 per cent annually over 1912 and 1913. Take then the rating base of $9,005,321 and the corrected net return of $588,820 would provide a rate of return of 6½ per cent, or instead of taking the rating base of $9,005,321 simply deduct the water rights, $1,998,117 and going value, $800,000, from the Master's total valuation, and the resultant rating base is $10,617,-782. Then also taking the corrected net return of $588,820 makes the rate of return .0555.

The foregoing computations and resultant rates of return are based on the Master's findings as to value except those items to which there are strictly legal objections, and upon the assumption that the operating expenses found by him are justified by the evidence, and we again insist that neither the valuation found by the Master nor the annual operating expenses estimated by him are shown with that clearness and certainty that is demanded in such cases.

On pages 164-166 of appellee's brief it is sought to arrive at the fair return by capitalizing the net earnings found by the Master. This, of course, establishes nothing. If the assumptions are correct no doubt their mathematical figures are correct, and the computation serves to prove only that their mathematical deductions are correct.

On pages 168, 169 of appellee's brief it is said that appellant neglected to deduct from the items of engineering and contingencies and interest during construction the percentage found by the Master for past depreciation. This criticism is well taken, as we have heretofore said and we frankly acknowledge the mistakes.

On page 169 of appellee's brief it is stated that the business done and the consequent gross earnings and resultant net earnings for the year 1914 were greater than for 1913, and substantially the same as for 1912. We simply refer the Court to our previous argument on this question and to the record at pages 990, 1080, 1108 and 1109.

On page 172 of its brief appellee states that the going rate of interest for loans on residence prop-

erty in Denver is 6 per cent, and that the interest rate provided by the Colorado statute is 8 per cent, and that the current bank rate on good risks is about 6½ per cent. The interest statute in Colorado was adopted 28 years ago, Section 3161, Rev. Statutes, 1908. Since that time other interest statutes have been adopted by the Legislature. In 1899, ten years later, an interest statute was passed fixing the rate of interest on County, City and School Warrants at 6 per cent. Revised Statutes, 1908, Sec. 3164. In 1891, Rev. Statutes, 1908, Sec. 305, a statute was passed, prohibiting trust companies from allowing or paying interest in excess of 6 per cent. The interest provided by statute on state warrants and certificates of indebtedness is 4 per cent (Sec. 6225, Rev. Statutes, 1908).

The fact that the company's long term bonds have been sold at a reduction so that the effect is that the company is paying over 6 per cent per annum, is not persuasive. It will be remembered that the present company was organized by the consolidation of a number of other companies. Eight million dollars in bonds were issued, $7,000,000 of them being divided among the previous owners of the consolidated system, the other $1,000,000 being used for construction. The original investment, therefore, was represented by the issuance of promises to pay, and as to what the value of the property consolidated was considered to be worth we have no knowledge. The bonds then have no significance whatever.

On page 174 of appellee's brief the rate of return found by the Master is compared with the rate of return on Liberty Bonds. Counsel say the bonds being tax free, really net an actual return of 3.9 per

cent, but the same is true of the rate of return established by the Master for he had already made an allowance to be deducted from the gross earnings for taxes. Of course the fact that a $2,000,000,000 bond issue was readily purchased by patriotic Americans would furnish little, if any basis for determining what investors considered their money worth. A very large number of the persons who purchased the Liberty Bonds would have purchased them if the government had provided no interest, for it was not considered a loan as an investment, but as a patriotic duty owed to our country. The purchase by investors of United States securities during the years 1914, and 1915, the years this case was tried, would be a better criterion for determining what money was worth during those years, bearing in mind of course, that United States securities are considered the best. In 1915, from January 1 to September,—the range of prices on United States securities was as follows:

U. S. 2s Consols, Reg., maturing April, 1930, lowest, 96¾; highest, 99¼.

U. S. 3s Reg. 10-20s, lowest, 109; highest, 111½.

Panama Canal 3s, maturing 1916, lowest, 100¾; highest, 102.

Risks and Hazards of Business.

At page 177 of their brief, counsel discuss the risks and hazards of their undertaking, and state that a rate of return should be permitted sufficiently large to take care of this risk or hazard. Counsel have failed, however, to point out a single hazard or risk

that is undertaken by them that is not amply and fully covered and insured against in the operating expenses and depreciation allowance allowed by the Master.

Counsel say, on page 177: "The Water Company's investment is not only subject to the usual risks ordinarily incident to the public utility business in a western city, but in addition it has always been and is now subject to the risk of municipal competition, *which is a real and most serious menace.* As is obvious, and is clearly demonstrated by the evidence in this case, *municipal competition would result in the practical destruction of the Water Company's entire investment*" (Italics ours). But why is the risk greater in a western city than in an eastern city? Denver is no longer a frontier town; it is as well governed as any eastern city. The city is what is known as a "dry town." The "cup" that was heretofore employed as a cup to cheer is no longer employed for that purpose, but is devoted to the single use of consuming the product of this company. Nor does the fact that the company is threatened with municipal competition, or being supplanted by the city in the water business add anything to the risk that the company would be entitled to charge for. It is a fact that the company is likely at any time to find itself out of business by reason of the city exercising its right of becoming the owner of a municipal water system, and this would amount to a "Practical destruction of the Water Company's entire investment." But this does not authorize the company acting by sufferance as it now is to charge for this risk. This is only an admission of what we have repeatedly said, that by reason

of this contingency the value of the company's property is greatly reduced, and that therefore the reproduction theory does not afford a fair basis for arriving at the value of the company's property.

A recent case analogous to the situation here is the case of Goldfield, etc., Water Company vs. Public Service Commission, 236 Federal, 973. This was a case involving the regulation of rates for water in the City of Goldfield, Nevada. The water plant had been constructed during the time that Goldfield was a prosperous, booming mining camp. The plant was large enough to supply thirteen million gallons of water per month, but at the time this suit was instituted its monthly sales were no more than five million gallons per month. The physical depreciation of the plant had been negligible, it only having been installed for a short time. But in arriving at the depreciation the Court in that case, at page 984 of the opinion said:

> "For eight years, while its mines have been yielding $65,000,000, Goldfield has been wonderfully prosperous. During that time the company apparently has had a free hand in the matter of fixing rates, but it has collected nothing for depreciation. The commercial value of its property has diminished more than 50 per cent. It seems unfair that this burden of accrued depreciation should be added to current depreciation and cast upon the present retail consumers of the company. Save in exceptional cases—and this is not an exceptional case—depreciation properly chargeable to one period

should not be collected from the customers of another period. Puget Sound Electric Ry. Co. vs. Railroad Com., 65 Wash. 75, 117 Pac. 739, 748, Ann. Cas. 1913B, 763; Harris vs. South Side Gas & Electric Co., P. U. R. 1915F, 747, 759; Whitten on Valuation of Pub. Service Corp., Sec. 483 et seq."

The argument used by the Court in the foregoing case is applicable here. Here the plant of the company is depreciated by age and use, but it is depreciated to a far greater extent by the fact that it may soon be valueless.

Counsel's cases cited on pages 179-180, with reference to rates that railroad companies should be entitled to receive, hardly furnish a fair comparison. A railroad company is subjected to many risks and hazards. It might have disastrous wrecks, there may be failures in crops that it depends upon to obtain its tonnage from, the constant risk of personal injuries to its employes, and many other things that might be cited make the business of operating a railroad hazardous. But what are the hazards here? What are the risks of the business? The demand for water will not decrease; it is an absolute necessity; there are no dangers of fires which could cause any great loss to the company; and furthermore, let us again turn to Exhibit "A-56," which is appellee's tabulation of the company's financial affairs during a period of twenty years. The only items included in this tabulation which could be considered as hazards or risks are the "operating expenses" referred to as loss and damage and personal injuries, and for these items for the twenty years included in the tabulation,

the average amount paid out for personal injuries annually was $68.50, and the average annual amount paid out for all other loss and damage was $692.60, or $761.10 annually for all of the hazards and risks suffered by the company for a period of twenty years.

Complainants below offered no other testimony sustaining their claims on this question of hazard or risk than the general tabulations showing their operating expenses. And taking them as a guide, it shows that the hazard that the company undertakes in carrying on its business is about as great as the hazard of operating a town well.

On page 178 appellee refers to the risks of its business on account of threatened municipal competition and says that municipal competition would result in the practical destruction of the Water Company's entire investment, and also speaks of the attempt of the city to force the company out of business. This company or its predecessors voluntarily entered into a contract in 1890 to furnish the city and its inhabitants with water for a period of twenty years; its contract is terminated; it is now a tenant by sufferance. It is not being forced out of business, and will not be forced out of business when the city erects its own plant. It should have prepared against the time when its services would no longer be required, and should have "written off" its investment during its franchise period, and now having reached the end of this franchise, and the city not being ready to supply itself, it is using its structures, which would otherwise be practically worthless, for temporarily furnishing Denver with water.

Appellee in concluding its argument on the question of rate of return refers to a few of the recent

decisions digested in Whitten on Valuation of Public Service Corporations (Vol. 1, Sections 731-785, Vol. 2, Sections 1433-1445). The cases selected are cases which show the highest rate of return of any referred to by Mr. Whitten, and with the exception of two, are all telephone and telegraph companies and railroads. We will select some other cases referred to by Mr. Whitten in the sections indicated by appellee:

1897, Steenerson vs. Great Northern R. R. Co., 69 Minn. 363, 2½ per cent on cost of reproducing terminals, 5 per cent on the rest of the road.

1902, Cedar Rapids Water Co. vs. Cedar Rapids, 118 Ia. 234, 4.4 to 5½ per cent.

1903, Spring Valley Water Works vs. San Francisco, 124 Fed. 574, 5 per cent.

1905, Long Branch vs. Tintern Manor Water Co., 70 N. J. Eq. 71, 5 per cent.

1908, Spring Valley Water Co. vs. San Francisco, 165 Fed. 657, 5 per cent.

1909, Cedar Rapids Gas Co. vs. Cedar Rapids, 144 Ia. 456, 5 to 6 per cent.

1911, Contra Costa Water Co. vs. Oakland, 159 Calif. 323, .0468.

The case of Louisville vs. Cumberland Tel. & Tel. Company, 225 U. S., 430, was an injunction proceeding to prevent the enforcement of an ordinance

fixing telephone rates. The Master, to whom the case was referred, found that the revenue under the reduction would be sufficient. The Court was of a different opinion and the injunction was granted. The case was reviewed by this Court and the values as found by the Court below were not disturbed, namely, $1,788,000. This Court, however, did not agree with the lower court as to the gross earnings or as to the operating expenses allowed, but found that the net return should be $89,455.62, which, as said by the Court, is just above 5 per cent on the judge's valuation. It had evidently been contended by the appellee in that case that any net rate of return under 6 per cent would be confiscatory, but Mr. Justice Holmes at page 436 of the opinion says:

> "We express no opinion whether to cut this telephone company down to 6 per cent by legislation would or would not be confiscatory. But when it is remembered what clear evidence the Court requires before it declares legislation otherwise valid void on this ground, and when it is considered how speculative every figure is that we have set down with delusive exactness, we are of opinion that the result is too near the dividing line not to make actual experiment necessary. The judge on assumptions to which we have stated our disagreement makes the present earnings 5 10/17 per cent with a reduction by the ordinance to 3 6/17 per cent. The whole question is too much in the air for us to feel authorized to let the injunction stand."

WATER RIGHTS.

Questions Involved.

A question of supassing importance is as to the ownership of "water rights" that is, those water rights acquired through the joint acts of the company and the City and its inhabitants in diverting water from the natural streams by the carrier company and applying it to a beneficial use by the City and its inhabitants, as distinguished from water rights purchased by the company from farmers, who had previously acquired title thereto by diverting it from the streams and applying it to a beneficial use on their farms. The question is not only important as materially decreasing the value of the property found by the master as being used and useful in furnishing Denver with water, but of far greater importance is it in involving principles long since settled and determined by the constitution, statutes and the decisions of the Supreme Court of Colorado.

One of the fundamental principles of the irrigation law of this state is that the user is the proprietor and owner of the water right that he uses. It must be borne in mind that in Colorado the water of its natural streams is declared by the constitution to be the property of the public (Colorado Constitution, Article 16, Section 5), and it is only the *use* of the water that the constitution permits the people of the state to become owners of. Our constitution differs from the constitutions of some of the other western states, notably California, in which there have been dedications of the water of the states. In California, for instance, water is dedicated to the public

use. The state, however, does not retain the ownership or proprietorship of the water, but merely declares that it shall be used for public or quasi public purposes, and therefore, subject to the control of the state. Furthermore, under the constitution of California, which differs radically from the constitution of Colorado, appropriators of water are permitted not only to acquire the right, for their own beneficial use, but to acquire a right in it for the purpose of sale, rental and distribution. California Constitution of 1879, Article 14.

On the other hand, in Colorado, where it is permissible to acquire by appropriation the right to the use of water, it is not permissible to acquire either the water or the right to the water for the purpose of sale or rental. In other words, we have in this state, by our fundamental law, said that appropriators of water from the natural streams may acquire the right by priority to the use of the water, but that the state will not permit an ownership, either in the water, or in a right to its use, except by those actually applying it to a beneficial use, but after this right of use has been acquired in Colorado in the manner provided by its laws, the party acquiring such right has a property right which he can sell, rent or otherwise dispose of, but before he can sell or rent the water he must have reduced it to an ownership, and this is accomplished, not by the diversion of the water from the natural stream, but by the application of it to one of the beneficial uses recognized by the constitution.

Through the constitutional and statutory provisions of the state and through the decisions of its courts, the respective rights of car-

rier ditch companies and users from their ditches have been fully determined. A person in Colorado has the right to divert the unappropriated water of a natural stream and to make application of it on land, and when these two acts have been completed the person has a completed appropriation and a resultant right to the use of the water of the stream, but, on the other hand, if a person, instead of constructing a ditch, should, through the agency of a carrier ditch company, procure water that the carrier ditch company had diverted from the stream, the person is none the less the owner of the water right, provided he complies with his obligations to the company that the law imposes and continues to pay the company for the services rendered, namely, for the carriage of water through the company's ditch; and the fact that the statutes of the state and the decisions of its courts have safeguarded the carrier company with respect to its rights as a carrier, in no manner militates against the principle herein enunciated, and to declare a different principle would be shocking, not only to a lawyer, but to any layman who has grown up with the development of the irrigation jurisprudence of the state.

Assuming that the foregoing statements as to the law in Colorado are correct, it can readily be seen what a disastrous effect a contrary opinion of the Supreme Court of the United States would have upon vested interests in Colorado. Thousands of acres of land that were theretofore practically worthless have been reclaimed by the industry of those who have cultivated the lands and applied the waters of the natural streams of the state under the guaranties of the state constitution; and it is the universal

understanding in Colorado that the law is that where a person procures water through the agency of a carrier and applies it to his land, thus completing the constitutional appropriation of the water right, the person thus applying the water to his land is the owner of such water right, subject to the obligation which the law imposes upon him to pay a reasonable charge for the carriage of the water, and to comply with other reasonable rules, either imposed by law or by the carrier company, and the same universal understanding as to lands applies equally to cities. Here in Denver millions have been expended in building permanent improvements with the confiding belief that water would always be available in the city, and that its procurement was not subject to the whim or caprice of any company, but that the company was acting as a carrier simply, and that its rates could be regulated by the proper authorities; that the water rights, so indispensable to the value and enjoyment of their property belong to the users thereof, and not to the carrier, who is simply a public servant furnishing to the users water dedicated to them by the constitution, under a contract of carriage; and it matters not whether this contract of carriage is made by the water company with the City as the representative of the inhabitants, or whether it is made with the inhabitants themselves, for the reciprocal rights of the users and the carrier would be the same, whether made with the city for the benefit of its inhabitants, or made with the inhabitants by the carrier.

Counsel have stated that the value of water rights as found by the Master, is too low.

Conceding, for the sake of argument, that the Master had the right to include the water rights other than the purchased water rights as a part of the property owned by the company, we do not admit that such rights were fixed too low, but contend that even in such case the rights were fixed too high. The evidence upon which the Master based the value of these water rights was evidence as to the value in Colorado of water on the basis of acre-feet. He placed this value at $55.00 per acre-foot. But the evidence given in this behalf by the complainant below was not as to the value of a water right independent of structures, but as to the values of water rights, including structures. But it is unnecessary to enter into a discussion as to what the value of these water rights other than purchased water rights is, for the question here involved is not a question of value, but of ownership.

Counsel, on page 228 of their brief, say that the appellants do not question the inclusion of the water rights which the company had purchased and which amounted to $949,500, but that they expressly conceded the propriety of their inclusion. Counsels' statement is not entirely correct. We do concede that the company, having purchased these water rights and purchased them for the purpose of employing them for furnishing water to the City of Denver and its inhabitants, is entitled in equity to have an allowance made, and whether this allowance is to be considered as added to the company's property or not, in justice, it would make no difference. With reference to these purchased water rights, however, there is a serious question as to whether the company, having purchased them for the sole and only purpose of

devoting them to supplying the City and its inhabitants with water, and since said purchase the City and its inhabitants, having kept alive the appropriations by use, as to whether the company did not obtain said rights in trust for Denver, and that its allowance in a rate making case should not be for the value of these water rights, but for the amount of money laid out and expended by the company for them in trust for Denver and its inhabitants. But the Master took as the basis of such valuation the amount that he considered represented the sale value of said water rights, which was at least ten times the amount that the company had paid for such water rights. These purchased rights will be discussed further under the subject of "Valuation." It must be further borne in mind that the company acquired these water rights not for the purpose of sale, not for the purpose of using said water rights for its own use, but for the purpose of carrying out the contract it had entered into with the City to furnish it a sufficient supply of water.

The Colorado Cases.

Counsel in their brief have frequently criticised the language of Mr. Justice Helm in the case of Wheeler vs. Northern Colorado Irrigation Company, 10 Colorado, 582, wherein the principle was first laid down by the Supreme Court of the State that the user, and not the carrier, was the *proprietor* of the water diverted from the stream. Counsel say that this is the unfortunate expression of a single judge, is not to be seriously regarded, and is not in keeping with other decisions of the Supreme Court; but an examination of the cases following this case

will show that Judge Helm in this case laid the foundation for rules which have become fundamental in the jurisprudence of Colorado. We will briefly refer to some of the cardinal principles laid down by Judge Helm which were intended to determine the rights of carrier and consumer, and which have been religiously followed ever since.

We quote the following excerpts from the opinion:

> "The agriculturists in the territory mentioned (referring to the vast plains east of the mountains) are, with few exceptions, unable to convey water from the natural streams to their land. To the successful cultivation of that region the carrier and consumer are, therefore, equally indispensable. Hence a wise legislative policy and an intelligent judicial construction require a careful consideration of the privileges, powers and duties of the carrier, as well as the rights and obligations of the consumer. The courts should protect the consumer in the full enjoyment of *his constitutional and statutory rights;* but they should also jealously guard the rights of the carrier; and so deal with it (the constitution and statutes permitting) as to encourage the investment of capital in the construction of reservoirs and canals for the storage and transportation of water." (Italics ours), Id. 586, 587.
>
> "But to constitute a legal appropriation, the water diverted must be applied

within a reasonable time to some beneficial use. That is to say, the diversion ripens into a valid appropriation only when *the water is utilized by the consumer* * * *." Id. 588.

"Certain peculiar rights are acquired in connection with the water diverted. It is unnecessary now, however, to enumerate these rights in detail. For the present it suffices to say that *they are dependent, for their birth and continued existence, upon the use made by the consumer.*" (Italics ours.)

"But giving these rights all due significance, I cannot consent to the proposition that the carrier becomes a 'proprietor' of the water diverted.

"A cursory reading of the statutes might convey the impression that the legislature regarded the carrier as possessing a salable interest in this water. And the constitutional phrase, 'to be charged for the use of water,' relating to the carrier's compensation, might, at first glance, seem to recognize a like ownership in such *use*. But construing all the provisions of that instrument bearing upon the subject *in pari materia*, the correctness of both these inferences must be denied. The constitutional convention was legislating with reference to the necessities and practical wants of the people. And this body, in its wisdom, ordained that the ownership of water should remain in the public, *with a perpetual right*

to its use, FREE OF CHARGE, in the people." (Last italics ours.)

"By Section 8, Article 16, of the constitution, from which the foregoing phrase is taken, the convention recognized the carrier's right to compensation for transporting water, and provided for a judicial, or *quasi*-judicial tribunal to fix an equitable maximum charge where the parties fail to agree." Id. 588-589.

It is obvious from a consideration of the foregoing quotations that the right to the use of water, which the consumer acquires, is not the only right in such persons making the use, but they are also entitled to the right to the *use free of charge,* and that the only compensation permitted by the constitution and the statute is compensation for transporting the water.

"Under the constitution, as I understand it, the carrier is at least a *quasi*-public servant or agent. It is not the attitude of a private individual *contracting for the sale or use of his private property.* It exists largely for the benefit of others; being engaged in the business of transporting, *for hire, water owned by the public, to the people owning the rights to its use. It is permitted* to acquire certain rights as against those subsequently diverting water from the same natural stream." Id. 589. (All but first italics ours.)

So, therefore, insofar as the foreging opinion of Judge Helm is concerned, there is no possible

question as to the application of the rules therein laid down to the facts in the present case. The appellee company here is a public carrier of water, impounding it and diverting it from the natural streams for the purpose of transporting it to users. It had the right, it is true, not only to divert the water from the natural streams, but also to apply it, itself, to a beneficial use, and thereby, not only acquire the right of carriage, but the right to the ownership of its use; but it didn't do this. It acted in the capacity of a carrier and agent and representative of the users of the water, and under the laws of the state, in performing this service, indispensable though it is, it acquired a right to compensation, but not a compensation for the use of the water, but a compensation for transporting water; and unless this decision of Judge Helm's has been overruled or modified by subsequent decisions of the Supreme Court of Colorado, this item of almost $2,000,000.00, which was awarded by the Master as a part of appellee's property, was improperly included.

We will now briefly review the subsequent cases of the Colorado Supreme Court upon this same question to see if there has been any departure from the principles announced by Judge Helm, but we will first refer to the special concurring opinion of Judge Beck in the case just quoted from. Judge Beck, commencing on page 597 of the opinion, concurred fully in the portions of Judge Helm's opinion heretofore quoted. As to some other features of the case, while he did not dissent, he arrived at them by a different source of reasoning, and expressly stated at the conclusion of his opinion that, except in so far as his views expressed did not concur in Judge Helm's

opinion, he concurred therein. The third member of the Court did not participate.

The direct cause of the institution of the foregoing case was the refusal of the ditch company to furnish water to the consumer at the carriage rates fixed by the company; the company demanding a bonus as a condition precedent to furnishing the water, and during the same year that this case was decided, 1887, the legislature of the state passed a statute in keeping with the opinion of the Court in that case, the statute being Section 3271, Revised Statutes of 1908, and is as follows:

> "It shall not be lawful for any person owning, or controlling, or claiming to own or control any ditch, canal or reservoir, carrying or storing, or designed for the carrying or storing of any water taken from any natural stream or lake within this state, to be furnished or delivered for compensation for irrigation, mining, milling or domestic purposes, to persons not interested in such ownership or control, to demand, bargain for, accept or receive from any person who may apply for water for any of the aforesaid purposes, any money or other valuable thing whatsover, or any promise or agreement therefor, directly or indirectly, as royalty, bonus, or premium prerequisite or condition precedent to the right or privilege of applying, or bargaining for, or procuring such water. But such water shall be furnished, carried and delivered upon payment or tender of the charges fixed by the county com-

> missioners of the proper county, as is, or may be, provided by law. Any and all moneys, and every valuable thing, or consideration of whatsoever kind, which shall be so, as aforesaid, demanded, charged, bargained for, accepted, received, or retained, contrary to the provisions of this section, shall be deemed and held an additional and corrupt rate, charge or consideration for the water intended to be furnished and delivered therefor, or because thereof, and wholly extortionate and illegal; and when paid, delivered or surrendered, may be recovered back by the party paying, delivering or surrendering the same from the party to whom, or for whose use, the same shall have been paid, delivered or surrendered, together with costs of suit, including reasonable fees of attorneys of plaintiff, by proper action of any court having jurisdiction."

Section 3272 and Section 3273 of the same revision provide penalties for violating Section 3271.

The section above referred to, 3271, was declaratory of the law announced by Judge Helm, where, on page 591 of the opinion referred to, he says:

> "Respondent cannot collect of relator the sum of $10.00, or any other sum, for the privilege of exercising his constitutional right to use water,"

and the constitutional right to use water referred to was the right, as announced in another part of the

opinion, to its use free of charge, upon the payment of compensation for transporting the water.

Following the case of Wheeler vs. Irrigation Company, the next case to announce the same principle, was the case of Farmers' High Line Canal & Reservoir Co. et al. vs. Southworth, 13 Colorado 111 (decided in 1889). The three justices, constituting the Court, each wrote an opinion, and we will quote briefly from the opinion of the Chief Justice and of Mr. Justice Elliott.

Chief Justice Helm, on pages 120 and 121 of the opinion, referring to his former opinion in Wheeler vs. Irrigation Company, says:

> "There is, therefore, no escape from the conclusion hitherto announced by this Court, that in cases like the present, the carrier's diversion from the natural stream must unite with the consumer's use in order that there may be a complete appropriation within the meaning of our fundamental law. * * * It would undoubtedly become unlawful were the water diverted not applied to beneficial uses within a reasonable time; but, when thus applied, the diversion unquestionably ripens into a perfect appropriation. * * *
>
> "*The foregoing view is not a recognition of ownership in the carrier, save of its canal;* nor does it in the slightest manner detract from the consumer's constitutional right of user. The carrier in and of itself has no independent priority (though the irrigation statutes use language that might

give this impression), and any rights it may hold in connection with the water diverted depend for their continuance upon the use made by consumers. *The carrier becomes the consumer's agent*, and its labors clearly inure to his benefit. By taking from its canal the consumer recognizes and ratifies its acts of construction and diversion, making them his own. *And the situation, so far as this question is concerned, is not different from what it would have been had the consumer in fact employed the carrier to construct the canal for himself alone.*" (Italics ours.)

And Mr. Justice Elliott, commencing on page 130 of the opinion, says:

"Can the carrier of water for hire be said to be using the water in the sense spoken of in the constitution? The railroad company, which carries farming implements from the great manufactories of the east to supply the farmers residing upon the broad prairies of the west, can hardly be said to be *using* such implements by the mere act of thus transporting them. From the specification of the purposes for which the water may be used it would seem that the 'better right' which attaches to the priority of appropriation was primarily intended for the benefit of those who apply the water to the cultivation of the soil or other beneficial use, rather than for the benefit of those engaged in diverting and carrying it to be

used by others. The diversion and carriage of water in point of time are necessarily prior to the application of it to agricultural or other useful purposes; but they are subordinate in point of right. The former are to the latter as the means to the end—an end without which neither the diversion nor the carriage would be lawful. *The carrier is the agent, the consumer is the principal. The former can lawfully pursue his occupation only by virtue of the service he renders to the latter. The consumer's right is primary, and unconditional; the carrier's is secondary, and dependent.*" (Last Ital. ours.)

On page 132 Mr. Justice Elliott quotes with approval from the language used by Judge Helm in Wheeler vs. Irrigation Company, 10 Colorado, 582, to the effect that the rights of the carrier are dependent for their birth and continued existence upon the use made by the consumer, and also that neither the title nor salable interest in the water from natural streams vests in the carrier by reason of his diversion or carriage thereof.

The next case decided by the Supreme Court of Colorado, directly involving this question, is the case of Combs vs. Agricultural Ditch Company, 17 Colorado, 146 (decided in 1892). The opinion in this case was by Mr. Justice Elliott. We excerpt the following:

"The mere diversion of the water is not an appropriation of it within the meaning of the constitution; there must be an appli-

cation of the water to beneficial use within a reasonable time or the diversion is unlawful.

"The ownership of a prior right to the use of water is essentially different from the ownership of stock in an irrigating company. The ownership of the stock like the title to other property may be acquired by descent or purchase; the ownership of the prior right can be acquired originally only by the actual beneficial use of the water. The very birth and life of a prior right to the use of water is actual *user*.

"The constitution provides that the water of natural streams may be diverted to beneficial use; but the privilege of diversion is granted only for uses truly beneficial, and not for purposes of speculation." Id. 151-152.

The next case decided was Wyatt vs. Larimer etc. Co., 1 Colorado Appeals 480 (decided in 1892). In this case the Court of Appeals, which is inferior to the Supreme Court, assumed to overthrow the doctrine previously held by the Supreme Court, and assumed to overrule the decision in Wheeler vs. Irrigation Company, *supra*, and held that the company was in no legal sense a common or private carrier, and that the canal company by reason of its diversion, appropriation and application of the water to a beneficial use, became the proprietor of the water, and as such could sell, transfer and deliver it to be used by those who required it for irrigation, id. 502; but when this same case was taken to the Su-

preme Court, that court held in 18 Colorado, page 298 (decided 1893), that the principles announced by the Court of Appeals were so at variance with numerous decisions of the Supreme Court, that it felt impelled to express its disapproval thereof, the Supreme Court concluding its opinion as follows:

> "We adhere to the doctrine that such a canal company is not the proprietor of the water diverted by it, but that 'it must be regarded as an intermediate agency existing for the purpose of aiding consumers in the exercise of their constitutional rights, as well as a private enterprise prosecuted for the benefit of its owners' "; citing Wheeler vs. N. Colo. Irrigation Co., 10 Colo, 582; Southworth case, 13 Colo., 111; Strickler vs. City of Colorado Springs, 16 Colo., 61; Combs vs. Agricultural Ditch Co., 17 Colo., 146; id 308.

While the Supreme Court in the above opinion stated that they were unable to see wherein the discussion of the Court of Appeals was essential to the questions involved, yet so jealous was the Court of the fundamental principles previously laid down by it with reference to the status and character of carrier ditch companies, that it would not permit to go unrebuked even an *obiter* opinion assuming to announce a different rule.

The next case is the case of White vs. The Farmers' Highline Canal and Reservoir Company, 22 Colorado 191 (decided 1896). Briefly referring to the facts in the case, the Court said on page 192:

> "This water has been principally used by farmers for agricultural purposes, it being the custom of the ditch company to *carry water for hire* for the defendant and a large number of agriculturists along the line of the ditch." (Italics ours.)

In the course of the opinion at page 197, quoting from Wheeler vs. Irrigation Company, 10 Colo. 582, the Court says:

> "Under the constitution, as I understand it, the carrier is at least a *quasi*-public servant or agent. It is not the attitude of a private individual contracting for the sale or use of his private property. It exists largely for the benefit of others; being engaged in the business of transporting, for hire, *water owned by the public, to the people owning the right to its use.*" (Italics ours.)

Again in the case of Farmers Independent Ditch Company vs. Agricultural Ditch Company, et al, 22 Colorado, 513 (decided 1896), the Court, prefacing its opinion, laid down the following rules:

> "1. A mere diversion of water from a stream does not constitute an appropriation recognized by the constitution and statutes. To make it such there must be an application of the water to a beneficial use, and, in case of irrigation, it must be applied to the land to make the appropriation complete.

"2 Ditch corporations are *quasi publici* carriers—a means to an end to be resorted to for the purpose of conveying water from the natural streams to places where it may be applied to beneficial uses.

"3. Appropriators of water from the same stream, through the same ditch, may have different priorities of right to the use of such water based upon the time of the several appropriations." Id. 521.

In the case of Cache La Poudre Irrigation Company vs. Larimer and Weld Reservoir Co., 25 Colorado, 144 (decided 1898), the question of carrier ditch companies was not directly involved, but the court in making the distinction between the owners of the stock in the ditch and consumers of water from the ditch made it clear as to the character of the respective ownerships of these two classes. It was contended in that case by the appellant that where a ditch belongs to a corporation the priority to the use of water belongs to the consumers, and the stock may be held by persons not using water. The court in answering this contention stated that the accuracy of it depended upon the facts, but that under the facts the owners of stock in the company and the owners of the water rights were the same persons, and that the company having been formed for mutual convenience, the stock in that particular company represented and stood for, not only the rights of the owners in the ditch, but also represented the right to the use of the water in the ditch. The court used this illustration at page 147:

"A ditch company organized merely as a *carrier* of water to those owning the appropriation may, as a corporation, own the physical or tangible ditch. Its stock may be in the hands of A and B, and the consumers of water may be C and D, and the transfer of the capital stock of the company may carry only an interest in the ditch. But where, as is the case at bar, the water rights, and the ditch through which they are enjoyed, are owned by the same persons as tenants in common, and for their mutual convenience they organize a corporation and convey to it the ditch and water right, and the corporation issues to the consumers its capital stock, which represents and stands for, not only the rights of the parties in the ditch, but, by a mutual arrangement, also represents the right to the use of water, or the priority right, then this stock (while not, of course, constituting the ditch or priority use of water) does represent both the ditch and that priority, and a transfer of the stock operates as a transfer of both kinds of property." Id. 147-148. (Italics ours.)

The next case to which we will refer is the case of Wright vs. Platte Valley Irrigation Co., 27 Colorado, 322 (decided 1900), in which the court at page 329 of the opinion quotes with approval from the "unfortunate expression" of Mr. Justice Helm in the 10th Colorado case, and holds that the carrier must be regarded as an intermediate agency existing for the purpose of aiding consumers in the exercise

of their constitutional right, as well as a private enterprise prosecuted for the benefit of its owners.

The case of Schneider vs. The People, 30 Colo., 493 (decided in 1903) was a case in which an indictment had been returned against Schneider for violating the provisions of the statues of 1887 of the State of Colorado, which statute is referred to and quoted at page 101 of this brief. The court held in that case that the information was insufficient as not properly charging the offense, but with reference to the statute itself the court held on page 498 of its opinion:

> "Under such statutes, now and at the time of the passage of the act in question in force, and under the decisions of this Court, the owner of such a ditch as is described in the act we are considering is aptly called a common carrier, and the carrier's diversion from the natural stream must unite with the consumer's use in order that there may be a complete appropriation within the meaning of the fundamental law when the consumer himself makes no diversion from the natural stream. A perfected appropriation, therefore, is the result of the combined act of the carrier—which consists in the taking or carrying away of the water from the channel of the stream—and the successful and actual application of water to the soil by the consumer. *It is also the established doctrine in this state that water may not be diverted from a natural stream unless the right to its beneficial use has been acquired,* and at the time is so needed." (Italics ours.)

In the case of Combs vs. Farmers' High Line Canal and Reservoir Company et al, 38 Colorado, 420 (decided 1906), the court at page 429 says:

> "In *Independent Ditch Co. vs. Agricultural Ditch Co.*, 22 Colo. 513 at page 524. the court says, as plaintiffs here contend, that the statute provides for a decree awarding priorities to the several ditches, and not to those claiming water under them. But the court immediately remarks: 'It is, however, necesary, in making proof, to show that the water has been actually applied to the land, in order that a completed appropriation may be shown.' While it is true that the priority decree is awarded to the ditch or ditch company which carries the water, yet in reality the thing decreed is a completed appropriation. Such appropriation consists of two acts: A diversion of water from a natural stream, and the successful application thereof, within a reasonable time thereafter, to some beneficial use. Where the consumer of water makes the diversion himself, a completed appropriation is made by the same person; but where the diversion is made by a carrier, and the successful application is made by another who is the consumer, a completed appropriation is the result of their combined acts. It is, as we have said, the completed appropriation for which a decre is awarded, and, while it is awarded to the ditch, it is made, as the decrees themselves specify, *for the use and benefit of the persons lawfully entitled*

thereto. And, while no ascertainment is made as to who are consumers under any particular ditch, necessarily the relative rights of ditch owners and all consumers are determined." (Italics ours.)

Again at page 432 said:

"This court, upon several occasions, has held that a ditch company, by means of which water consumers enjoy their appropriation, *is the trustee and representative of the consumers for the protection of the rights of the latter.*" Wheeler vs. Northern Colo. I. Co., 10 Colo., 582, 592; F. H. L. C. & R. Co. vs. Southworth, 13, Colo., 111, 121, 132; Ind. Ditch Co. vs. Agr. Ditch Co. supra; Canal Co. vs. Loutsenhizer D. Co., 23 Colo. 233, 235." (Italics ours.)

In the case of O'Neil vs Fort Lyon Canal Co., et al, 39 Colorado, 487 (decided 1907), the court, quoting from the case of Combs vs. Canal Co., 38 Colo. 420, held that the appropriation where the carrier and consumer were different persons, consisted of two acts, and that the appropriation was the result of these combined acts of the carrier and the consumer, and on page 494 of the opinion said:

"The defendant (carrier) company and its grantors were trustees for the stockholders and consumers and bound to protect the intersts of all."

In the case of Comstock vs. Larimer and Weld Counties, 58 Colorado, 186 (decided 1914), the doc-

trine of ownership of water rights was again reaffirmed. The Court at page 199 of the opinion, said:

> "Begining with the first application of water in Colorado to beneficial uses, the right of preference to such use between respective claimants has been made to depend upon *prior appropriation and necessity of use.* This doctrine has become thoroughly entrenched in our jurisprudence, through constitutional and statutory provisions, and by a uniform and unbroken line of judicial decisions." (Italics ours.)

Appellee's Cases Distinguished.

We have now discussed, not all of the cases in Colorado, but the leading ones with reference to the status of water carriers and the consumers, except the case of the City of Denver vs. Brown, 56 Colorado, 216 (decided 1914), the case upon which counsel so confidently rely to sustain their contention that the carrier and not the consumer is the owner of the water right. This was a decision en banc, all the justices concurring, and the court, far from departing from the fundamental principles laid down by Mr. Justice Helm in Wheeler vs. Irrigation Company, 10 Colorado, 582, and thereafter steadfastly adhered to, at the outset of its opinion on page 222, as an introductory adopted the identical language of Mr. Justice Helm by saying:

> "Such a company is a *quasi* public carrier for the purpose of conveying water from natural streams to places where it may

> be applied to a beneficial use. IT IS NOT THE PROPRIETOR OF THE WATER WHICH IT IS ENTITLED TO DIVERT, BUT MUST BE REGARDED AS AN INTERMEDIATE AGENCY EXISTING FOR THE PURPOSE OF AIDING CONSUMERS IN THE EXERCISE OF THEIR RIGHTS TO APPROPRIATE WATER, as well as a private enterprise prosecuted for its benefit.—Farmers' I. D. Co. vs. Agricultural D. Co., 22 Colo. 513, 45 Pac. 444, 55 Am. St. Rep. 149; Wright vs. Platte Valley I. Co., 27 Colo. 322, 61 Pac. 603; *Wheeler vs. Northern Colo. I. Co.*, 10 Colo. 582, 17 Pac. 487, 3 Am. St. Rep. 603; Wyatt vs. Larimer and Weld I. Co., 18 Colo. 298, 33 Pac. 144, 36 Am. St. Rep. 280" (italics and caps ours),

and by this announcement expressly reaffirmed the doctrine laid down in the Wheeler case and the several cases following it, which counsel say have been overruled by the decision of an inferior court in the case of Wyatt vs. Larimer etc. Co., I Colorado Appeals, 480. But before proceeding with an analysis of the opinion in the foregoing case (Denver vs. Brown), it is necessary to state the facts involved in that controversy. The case was commenced for the purpose of determining the rights to the use of water from the "City ditch." The City ditch had been purchased by the city from its original owners, and at the time the case was tried the city was the beneficial owner of the ditch, and was also the beneficial owner of certain water rights connected with the ditch. There were also others not interested in the ditch, who had water rights

therein (but these rights were not involved in the suit), therefore, the city occupied the dual position of having a ditch through which it conveyed its own water, as well as being a public carrier for the conveyance of water rights owned by others. The city from time to time used the water rights that it had acquired for the purpose of irrigating trees, and along in the 90's began to use this water right for irrigating its parks and filling lakes in parks. It was also shown that when the park area would be increased, the city would require all the water, which it had theretofore applied to the irrigation of trees upon its streets, but in the meantime the city was renting these water rights, to which it had become entitled by use, to others who might desire the use of the water, as well as carrying water to others who had acquired the right to the use thereof. At page 232 the court, after having reviewed the facts, made this finding:

> "At the time the city was exacting these contracts it was the beneficial owner of the ditch and had been for something like 18 years. Its use of water as a contract consumer was continuous each year from the time it first began to apply water to the irrigation of shade trees on the streets of the city. When it became the beneficial owner of the ditch this use was continued without interruption, except that some time in the nineties the volume it used was to some extent decreased. It intended, however, to resume the full use later. *As stated, the contracts under consideration were executed subject to the needs and requirements of the*

> *City as a user.* As to consumers entitled to water from the ditch by virtue of prior user, we think these conditions were invalid in so far as they related to the volume which such consumers were entitled to have turned out to them, for the reason that to this extent their rights had attached, and they could not be deprived of them unless they voluntarily consented." (Italics ours.)

Therefore, while the court in this case laid down rules, not only with reference to water rights owned by the city but the water it was delivering as a carrier, the question here involved *was as to the contracts, which were in the nature of leases of the City's* appropriated water rights, and as to these water rights, which the city owned absolutely, the court held at page 233 of its opinion that the city had leased such rights to the water which it had acquired as a consumer above those necessary for its present needs. There is not one syllable in the whole opinion which in any manner overrules or modifies the decision in the Wheeler case, but it serves to clearly emphasize the principles therein announced.

On pages 260-261 et. seq. of their brief counsel cite and quote from the case of the People vs District Court, a case in the Colorado Supreme Court not yet reported. This case was in the nature of mandamus to compel the District Court to enter a decree in accordance with the judgment and opinion rendered in the case of City and County of Denver vs. Brown, 56 Colorado, 216, which has just been referred to. Counsel have included the opinion in this case in an appendix at pages 436-437 of their brief.

Counsel say that while the determinations of the Supreme Court in the Brown case are clear, they are rendered still clearer and more definite by the Court's own analysis thereof given in this last case.

An examination of this last opinion will show that the court did not intend to in any manner modify, change or overrule the opinion in the Brown case, but simply pointed out again to the lower court what had been its ruling in the Brown case. Therefore, in order to have a full understanding of the court's opinion in the last case, it is necessary to be familiar with the facts and opinion in the Brown case. The Court, for instance, used the following language in People vs. District Court:

> "As to the *excess* water, which term *will be comprehended by those familiar with the litigation*, we held the limitations imposed by the city upon the users of this water were in effect a lease of the amount *not necessary for the city's present needs* and preserved the water privilege in the city the same as though *it had continued in the use.*" (Italics ours.)

The excess water above mentioned was the excess water which was explained on page 233 of the Brown case, and was water which the city had acquired the beneficial use of by its own previous application. It was not water which it was carrying for hire, but water, the use of which belonged to it, and that it had the right to sell, lease or otherwise dispose of, the court saying:

"As to any *excess* water for which these consumers contracted by contracts containing these limitations, or as to those whose rights were initiated under these contracts the limitations imposed must be treated as a lease of the water, the right to the use of which the city had theretofore acquired and, therefore, to this extent are valid. We are also of the opinion that the use of water under these contracts by consumers, bound by the limitations imposed, preserved the status of the city the same as though it had utilized the water covered by these contracts for its own needs. In other words, by these contracts it leased its rights to the water *which it had acquired as a consumer* above that necessary for its present needs, and hence preserved them to all intents and purposes exactly as though it had continued the use of such water. *The Cache La Poudre Ir. Co. vs. Larimer and Weld Co.,* 25 Colo. 144, 53 Pac. 318, 71 Am. St. 123."

Furthermore, the only question under consideration in the Brown case was with reference to this same excess water which belonged to the city, for on page 232 of the opinion it is clearly stated that the contracts under consideration in the case are for water, the use of which the city owned.

Counsel also refer to language in the mandamus case on page 265 of their brief, where they refer to the expression that "the city was the proprietor of the appropriation." By reference to the Brown case to see what the Court was discussing when it used

this expression it is obvious that the Court had reference to the water owned by the city, because that was the only water in controversy in the case.

The Court at the outset of the opinion in the Brown case laid down general rules with reference to carrier companies, with reference to water rights owned by consumers and the obligation the consumers owe to the carrier, thereby again reaffirming the doctrine so long adhered to; but as far as this case is concerned the questions decided were as to water rights owned by the city. However, all of the expressions, are in keeping with the decisions thertofore rendered by the court.

Counsel for the City are criticised for not having referred to this case of the People vs. District Court in their opening brief, and counsel for appellee try to draw the inference that by it not having been mentioned it must have been considered as against the contention of appellants. It would have been highly improper to have referred to the case; it is highly improper to refer to it now, but we are driven to it in self defense. The opinion referred to has not yet been publicly announced. A petition for rehearing has been filed and the case is now pending on rehearing, and as to what the final announcement of the Supreme Court in this case will be we can only speculate.

From a consideration of the Brown case and the previous cases with which it is in line, the following rules clearly result:

1. Persons in Colorado may divert water from a natural stream, either for their own use, or they

may divert the water as carriers for the purpose of furnishing consumers with the use of the same.

2. A corporation or individual may divert water from a natural stream for a double purpose:

(a) For irrigating its or his own lands.

(b) Also to act as carrier to irrigate lands of others.

3. When a corporation is organized for the purpose of acting in the capacity of a carrier, the water rights by it transported belong to the person applying the water to a beneficial use. The corporation is then the owner of the ditch and other structures, and has the right to enter into contracts with the consumers for its protection, and if the consumer fails to comply with the contract, the corporation is no longer under obligation to furnish the service, but upon the termination of such contract the water rights thus lost by the consumer do not become the property of the corporation, but are forfeited to the people of the state until again applied to a beneficial use by some other consumer.

4. A consumer once having contracted with the carrier for the carriage of water is entitled to continue such relationship without intermission by paying the carrier company the rate the company may lawfully exact.

The foregoing rules are conclusively and indisputably the law in Colorado, and with them in view we will analyze the Colorado cases cited by counsel, which they claim sustain the proposition that the carrier and not the user is the owner of the water right.

Counsel on page 237 of their brief say that an appropriator has the right to divert water from the natural streams and to convey it to the place of use, and also has the right, either to apply it himself to a beneficial use, or to sell and thereby confer upon others permanent rights so to do; or if he chooses, to continue to lease such rights to others, himself retaining the title. All of these propositions are conceded, provided the person taking the water from the stream becomes an appropriator, that is, not only diverts the water, but applies it to a beneficial use, but until he has completed the appropriation by applying it to a beneficial use, he cannot lease such rights to others, and cannot sell such rights to others, and he cannot retain the title, for there is as yet no title in him to retain. He can, however, during the process of constructing his system, convey to others an interest in his structure, and those to whom he conveys thereby become proportionate owners in the structures, and by applying water out of the ditch to their land acquire water rights.

Counsel on page 238 of their brief make this statement:

> "It is a fact, which appellants will not dispute, that almost without exception the large irrigation companies of Colorado have from the beginning pursued the course of selling and conveying permanent rights to take water from their ditches, rather than leasing or licensing such rights for limited periods."

While we do not admit the statement of counsel, we do admit that a large number of irrigation

companies of Colorado have conveyed permanent rights to take water from the ditches, but the conveyance of these rights in such cases has made the purchasers owners in the ditch and pro rata owners of the structures, but such companies are not carrier ditch companies; they are mutual ditch companies for the purpose of furnishing water to those interested in the company or its works.

Counsel first cite the case of Combs vs. Agricultural Ditch Co., 17 Colorado, 146, 150 at page 239 of their brief, and quote the following language:

> "Those who construct ditches and divert water for general purposes of irrigation must within a reasonable time apply the water to beneficial use; or else, upon proper application and for proper consideration, they must dispose of the same to those who are ready to make beneficial use of it."

This is illustrative of the principles we have laid down. A person may construct a ditch and divert water and can become the appropriator either by applying the water himself to lands, or may act in the capacity of a carrier, and the use of the words "dispose of" by the court was not intended to mean that the person constructing the ditch had thereby acquired title to the water.

In the case of the New Mercer Ditch Company vs. Armstrong, 21 Colo., 357, 363, cited on page 239 of counsel's brief the court did not hold that a corporation could divert water from a stream for speculative purposes, or that it could sell it to purchasers without itself having made a beneficial use of the

water. The court did hold, however, that a corporation would have the same rights as a natural person in regard to the sale of water, and could sell it in accordance with the doctrine announced in Strickler vs. Colorado Springs, 16 Colo. 61. The case referred to (Strickler vs. Colorado Springs) was the first case in this state in which it was determined that water rights could be transferred by sale separate from land, and one of the points indicated by the court, as included in the issues, was as follows:

> "Can the priority of a farmer to the use of water for agricultural purposes be transferred by sale to a city for city purposes so that it may succeed to the rights of the original appropriator?" id. 66.

So it is readily seen that in the New Mercer Ditch Company case the Court did not decide that a corporation had *something to sell before it had acquired title to it*, but simply held that a corporation had the same rights as a natural person, and that when it had become the owner and appropriator of a water right that it could sell it to others.

Blakely vs. Fort Lyon Canal Co., 31 Colo. 224, page 240 counsel's brief, was a case in which the Canal Company had constructed a ditch and had sold interests therein by deeds, in which deeds it was provided that when the capacity of the canal was disposed of, the canal would vest in the owners of the water rights. This company was not acting as a carrier ditch company, but was disposing of not only the right to carry water in the ditch, but a pro rata interest in the ditch itself to the purchasers. There was not a word said in the opinion about

carrier ditch companies, and nothing to indicate that this was a carrier ditch company. On the contrary it is plainly shown that the rights the company was selling were not the rights of transporting water through its ditch, but were pro rata rights in the structures themselves.

The case of Butterfield vs. O'Neill, 19 Colo. Appeals 7, counsels' brief page 241, was a case of a mutual ditch company; a number of prospective users of water having organized for their mutual benefit to appropriate water through the Cushman ditch. After the ditch had been used for a number of years the plaintiff, Butterfield, commenced a suit against O'Neill, et al, claiming to be the owner of all the water in the ditch, alleged an abandonment by the defendants, and grounded his claim upon a prior appropriation of the water by himself and his grantors, and under the foregoing statement of facts the court held that his claim of a prior appropriation was baseless for the reason that the appropriation had been made by the Cushman Ditch Co., that all the stockholders were interested in such appropriation, that there had been no abandonment, and that therefore there were no facts upon which to base an independent appropriation of the plaintiff. The Court did not hold that the plaintiff in the case was an independent appropriator, but held that his appropriation existed in common with the other appropriators.

Counsel conclude their list of so-called ruling cases by citing the case of Dickson vs Dick, 59 Colo. 583, counsel's brief, page 241. The ditch companies in this case were the same kind of ditch com-

panies as that in the case of Blakey vs. Ft. Lyon Canal Co., 31 Colo. 224, above discussed. The ditch companies in question, the Homestead Co. and the Dickson Reservoir and Irrigation Co., were companies organized for the purpose of selling rights in the ditch. It is nowhere stated or intimated that they were carrier ditches, or that the water rights referred to did not convey rights *pro rata* in the properties of the companies. In fact, as is shown in the statement of facts, some of the rights in question were purchased for the purpose of complying with the provisions of the Desert Land Act, and inasmuch as it is necessary, in order to comply with the Desert Land Act, to have attached to the land a permanent water right, it is to be asumed that these companies were selling such rights, that is, rights which carried with them, not only the privilege of taking water from the ditches, but also a corresponding interest in the structures, and in view of the fact that carrier ditches are nowhere mentioned in this opinion, it must be conclusively presumed that the question of rights, as between carrier ditch companies and consumers, were not involved in the case; in fact, had this company been a carrier ditch company, it would have been unlawful for it to have charged $15.00 per acre, or any other amount, for the privilege of taking water out of the ditch. This was expressly held in the Wheeler case, 10 Colo., 582, wherein it is said at page 591:

> "Respondent cannot collect of relator the sum of $10.00, or any other sum, for the privilege of exercising his constitutional right to use water."

All that could be charged if it were a carrier ditch company would be the annual charges for the carriage of the water. Not one of the cases referred to by counsel was a carrier ditch company. All of them were what is known as mutual ditch companies, or promotion companies designed ultimately to become mutual ditch companies.

But what is the character of the water company in the present case? It was organized in 1894 for the purpose of taking over the rights of the companies that had theretofore furnished water to the city of Denver and its inhabitants for hire. It was the owner of a subsidiary company, The South Platte Canal and Reservoir Company, which also was organized, according to its articles of incorporation, (Record, page 904) to supply water to the City of Denver and additions thereto and towns and cities in the vicinity thereof. Its reservoirs and ditches were decreed water for supplying the city of Denver and the inhabitants thereof with water for municipal, domestic and other purposes (Record, page 920). It has acted as a carrier company; in fact, there is no disputing this contention. By ordinance No. 44 of 1890 (Record, page 941), the company was given "the right and privilege of laying down, continuing and maintaining water pipes, valves, hydrants and apparatus in the conveyance and distribution of water in, upon, along and through the following streets, etc." The ordinance also provided by Section 4 thereof that the company should at all times furnish water from its mains to parties desiring the same upon application, under such reasonable rules as might thereafter be prescribed. Section 5 provided the rates to be charged to private consumers.

This ordinance was passed by the Council by virtue of its powers given by Charter of 1889, referred to on page 54 of appellant's original brief, and the company by accepting the grant of the ordinance became bound by all its terms and it became a carrier for hire for the city and its inhabitants, subject to the constitution and statutes of the state, and subject to the provisions of this ordinance. There was a special provision in this ordinance, the same being Section 11, with reference to the purchase by the city of the company's works at the expiration of the franchise, and in this provision for purchase, it was the *works* of the company referred to, and nowhere were "water rights" mentioned or included in the property provided to be purchased.

There is but one other Colorado case cited by counsel necessary to refer to, and that is the case of Denver vs. Walker, 45 Colorado, 387. Counsel have referred to this case at pages 230, 250 and 253 of their brief. The ditch involved in this case was the same ditch involved in the Brown case. The water right involved was water that belonged to the city, which it had acquired by having applied the same to a beneficial use, and by permission of the Council certain people were allowed to use the water belonging to the city during the times the city did not require it for its own uses. There is nothing whatever in the case which affects the question here involved, except to bear out our interpretation of the Brown case.

The Court in its statement of facts, upon which its conclusion is based, states on page 389 of the opinion:

> "There is not a particle of evidence that plaintiffs' grantors ever made, or acquired, an appropriation of water from the South Platte river, by any means. Perhaps it inferentially appears, or is virtually admitted, that, by means of the ditch in question, an appropriation of water was made by the grantor of the city which right, at least after its acquisition by the city, has been applied by the municipal authorities in irrigating lawns, gardens, trees and parks of the city * * **"

and again on page 393 it is said:

> "Whether the appropriation through the City ditch was originally made for the city's benefit, does not appear and possibly it is not important in this case; but it would seem from the record that, at least after the city acquired the ditch and its accompanying water rights, it has so used them as a source of supply of water for the purpose of irrigating trees, lawns, city parks and municipal property in the City of Denver, lying thereunder."

The result of the case was that the court held that the plaintiffs' rights were not proved, that is, the right of an appropriation of water out of the Platte River; and while the case is not decisive of any question herein involved, it tends to support the facts assumed by the court in the Brown case *supra*, concerning the same ditch, in which it is contended that the City is not only the owner of the ditch, but also of its appropriated water rights.

Let us now examine the master's determination of this question. At page 129 of the record he says:

> "The ownership of the 'appropriation,' under such circumstances, is or may be fixed by contract between the one who diverts and the one who beneficially applies such water. It is plain that such parties by contract between themselves may vest the ownership of the appropriation in whom they please. This I understand to be the rule adopted by the Supreme Court of Colorado in City of Denver vs. Brown, 56 Colorado, 216."

It is not true that in Colorado the ownership of an appropriation may be fixed by contract. An appropriation may be sold or the rights to the use of the water acquired by the appropriation may be leased or otherwise disposed of, but the appropriation originally is fixed by law, giving the benefit to the user. Neither was any such rule as this laid down in the Brown case or even mentioned, and even if it were the rule in Colorado that the ownership of the appropriation or the ownership of the water right could be fixed by contract, there is no evidence in this record to show that any such contract was made.

The master says at page 129 of the Record:

> "There is no testimony, in the voluminous record accompanying this Report, from which it can be fairly inferred that any consumer of the Water Company at the time he paid his water rates and received his

> license, believed or claimed he was making an appropriation of the water of a natural stream of Colorado or was acquiring as against the Water Company any right of any nature to the use of water except as stated in that license."

Neither is there any evidence in the Record that any consumer *believed* or *claimed* that when he used water from the Company's works he was thereby not only paying the company's just dues as a carrier, but that also he was by this act of user perfecting for the company a valuable water right.

There is nothing in the licenses in question that intimates any contractual relation as to this water right or appropriation. These licenses are found in the Record at page 970, and are copies of the forms used for various years in the history of the company. They purport to be licenses, but there is no provision in them that the Denver Union Water Company is the owner of a right that the consumer is perfecting, and they would be without effect if there was. These so-called licenses amount to nothing but a receipt for the money paid by the consumers for the carriage of the water. There are certain provisions in them as to the purpose for which the water shall be used, and providing against furnishing water to others from the consumer's tap. These provisions are regulations, reasonable regulations, that are permitted by the ordinance of 1890 to be made by the company, but there certainly is nothing in them from which it can be inferred that the water right, this valuable right dedicated by the constitution of the state to users of water, is bargained

away or sold to the water company. There is only one contract involved with reference to furnishing water to the City of Denver and its inhabitants, and that is the ordinance of 1890 (Record, page 941). This ordinance is a contract. It fixes the obligations existing on the part of the water company and also on the part of the city and its inhabitants, or did fix them during the period of its existence. The city, through its council, had the right by delegation from the State Legislature, to enter into this contract with the Water Company for the purpose of not only furnishing itself water for necessary uses, but also as the agent and representative of its inhabitants to furnish them water. The permission to make the regulations contained in Section 4 of the ordinance was the provision that gave the company the right to make regulations as indicated in their water receipts, or so-called licenses; so therefore, for the master to arrive at the conclusion that a contract had been made with the users of water and the Water Company whereby it was agreed that the appropriation should belong to the Water Company, is preposterous. There is no evidence whatever to sustain it, and if any such contract had been made, under the doctrine as laid down in the Wheeler case, 10 Colorado, its provisions would have been void.

Here is a company, which has been given an opportunity by the City of Denver to construct works and to furnish water to the City of Denver and its inhabitants for a period of twenty years and an opportunity to make profits in furnishing such water. In the accomplishment of this undertaking it has had to divert water from the natural streams of the state in

order to supply the demands of the city. It has had to acquire land and build reservoirs, construct aqueducts, and for all of this expenditure it is entitled to receive a fair return upon its investment, but the water rights, the most sacred species of property right in the State of Colorado, were not dedicated to carriers, but were dedicated to those who would make use of the water, and thereby materially increase the wealth of the state. This right to the use of water in Colorado, dedicated by the constitution, is a possessory right. The fee, as it were, is retained by the state, and only this possessory right is permitted to be owned by the citizens of the state. It is of the same character as the right granted by Congres to citizens of the United States to the possession of mineral claims on the public domain. A person has the right to go on the public domain of the United States and prospect for minerals, and if he discovers any he is given the possessory right of a mining claim, which he can hold and enjoy as long as he complies with the law with reference to work and development, or he can sell it or lease it, but the fee of the mining claim remains in the Government unless the owner sees fit to patent it. This right of possession and use, like the right in Colorado to the use of water, may be forfeited by nonuse and then becomes open to relocation or reappropriation by others. This possessory right to mining claims is given by the Government free to its citizens to encourage them in exploiting and developing its mineral resources and in Colorado the use of water is granted free to those who will devote it to the enrichment of the soil that the wealth of the state may be increased.

We will now refer briefly to some of counsel's arguments and deductions that they seek to draw from the various decisions in Colorado. It is stated on page 255 of their brief after quoting from the Brown case, that the Supreme Court in that case "pointed out the difference between the status of those who by outright purchase or other permanent arrangement had acquired a perpetual right to water diverted by and flowing in the ditch, and the status of those who were licensees only, under temporary contracts for limited periods, such as one irrigation season."

The court does not attempt to draw any such distinction. There is no distinction in Colorado between permanent arrangements and arrangements from year to year. There is a distinction between carrier ditches and ditches which are mutual, but a person, whether he contracts to take water for a year or to take water for two years or for any other length of time through a carrier company, occupies the same identical position.

Counsel throughout their discussion on this subject have confused the contract rights existing between a consumer and a carrier ditch company. While contracts are entered into in Colorado between carrier companies and consumers, the rights thus obtained from the carrier are concurrent with the consumers' legal right. Under the statutes of the state the consumer has the right to demand water from the carrier company, if there is water available for his use, and the fact that contracts are entered into in no way modify or restrict the consumer's right. As was said by Wiel on Water Rights in the Western States, Third Edition, Section 1328:

"Contract Rights, When Valid are but Concurrent With the Noncontract Right.

"The public service right is wholly irrespective of contract, or, as has been said, "the right of an individual to a public use of water is in the nature of a public right possessed by reason of his status as a person of the class for whose benefit the water is appropriated or dedicated. Where a contract right exists, it is only cumulative thereto. It does not displace the underlying right belonging to the consumer as a member of the public, such as the right to enforce compulsory service, or to complain of unreasonable or discriminating conditions and probably a contract requiring the consumer to surrender this public right is *per se* illegal."

On page 266 *et seq.* counsel draw deductions from the authorities that they theretofore have referred to. Some of their deductions correctly state the law, others are far from being the law. Under their paragraph 3 on page 266 they refer to the rights which the carrier has conferred. The carrier can confer no rights to the use of water unless it has theretofore acquired the title in itself. It can contract to supply the water, but the law confers the water right upon the user.

On page 267 of their brief they conclude that after an appropriator has constructed works and diverted water, they have the right (a) to confer upon others by deeds, etc., perpetual rights to take water from their conduits. This may be true, but such per-

petual water rights are rights not only for the right of carriage of water, but would become rights as well in the structure. Under (b) to confer upon others by leases, licenses or their equivalents, temporary rights to furnish water. The rights conferred are not conferred by the company; the company has no right to lease or license, except that the privilege of using the carrier ditch to convey water might be called a lease or license.

On page 268 they conclude that whenever a consumer's right to use water terminates the diverter has such right for sale, lease or license to others.

As heretofore explained, this would be in direct conflict with the constitution of the state. It would permit a carrier ditch company to acquire water rights without complying with the constitutional mandate of applying it to a beneficial use. The rule is that when one user of water discontinues his use from a carrier company's ditch or system the right is subject to be applied for by others desiring to put it to a beneficial use.

As was said by Mr. Justice Helm in the Wheeler case at page 125:

> "* * * Certain consumers will abandon the use of water from the carrier and other consumers will secure the right to the use thus abandoned."

On pages 272-273 appellee contends that the relation existing in Denver between the company and the citizens is that of licensor and licensee, but what has that to do with the status existing between the company and the consumer, whether the contract exist-

ing between the company and the consumers is denominated a license, a deed, a lease or a real estate mortgage wouldn't change the status from the controlling facts. The company being a carrier, never having acquired title to the use of the water conveyed by it had nothing to license except its carriage and had nothing to lease except its carriage, or if it saw fit in the form of a deed to make this contract with the consumers, the relationship nevertheless would not be changed, because it is fixed by the law.

> "Whenever a private consumer has allowed his license to lapse by failure to renew, or has abandoned or forfeited the same, the company has had the right, which it has exercised, to apply the water to other beneficial uses, or, if it chose, to license some other private consumer to make such application."

It is admitted that the company, in the event that the consumers should forfeit their rights to the use of the water by abandonment or otherwise, has the right itself to apply the water to a beneficial use, the same as any other consumer, and thereby create a title to the water in it, but we deny that the company has ever exercised this right, or that there has ever been any abandonment by the City or its inhabitants of such rights. Nor does the company make any such claim.

A carrier ditch company has nothing to sell in Colorado in addition to its transportation. It is a public servant, a public agent. It is authorized to carry water, not for sale, but for the purpose of furnishing it to those who have the constitutional right

to apply for it, and its compensation for its carriage is full compensation for everything that it has the right to charge for.

On page 277 counsel refer to the case of the San Joaquin etc. Irr. Co. vs. Stanislaus County, 233 U. S. 454 and say "that to hold, as contended by appellants, would be to say that while the law declared that water could be appropriated for sale, yet it meant that there should be nothing to sell. Water could be appropriated for sale in California, but it cannot be appropriated for sale in Colorado. The constitution of California permits the appropriation of water for sale, but in Colorado it can only be appropriated for use. This case will be more fully discussed later in this brief.

The case of Wyatt vs. Larimer etc. Irr. Co., 1 Colo. App. 480, and also the same case in the Supreme Court, 18 Colo. 298, have heretofore in this brief been referred to, and it is only necessary now to remark that counsel have paid a great tribute to the discussion of the inferior court, where the Court ruled according to their contentions, but in referring to the discussion of the Supreme Court, reversing it, state that the opinion was confessedly *obiter*, and in that sense the decision was improper. Counsel are to be congratulated upon their ability to obtain comfort from the ruling of a court, that has been reversed by a higher court.

On page 292 of their brief counsel in quoting from the case of Wright vs. Platte Valley Irrigation Co., 27 Colo., have indicated two omissions in their quotation by asterisks. The first omission is as follows:

"It is true, as has been frequently announced by this Court, that a ditch company is not the owner of the water it diverts through its ditch; neither is its status, in the strict legal sense of the term, that of a 'common carrier.' As was said in *Wheeler vs. Northern Colorado Irrigation Co.*, 10 Colo. 582:

" 'The carrier must be regarded as an intermediate agency existing for the purpose of aiding consumers in the exercise of their constitutional right, as well as a private enterprise prosecuted for the benefit of its owners.' " Id. 329.

This portion omitted by counsel in their quotation is the same "unfortunate expression" made by Mr. Justice Helm in the Wheeler case, and the Wheeler case is cited as authority.

The next omission is as follows:

"While it may not impose conditions that operate to deprive consumers of the enjoyment of their constitutional rights, it may require them to exercise such rights under reasonable regulations and limitations."

At page 295 of their brief counsel for appellee make this statement:

"At pages 33 and 34 of their brief appellants quote from Wiel on 'Water Rights in the Western States," and from Kinney on 'Irrigation and Water Rights.' But these

> text books were written prior to the time when the Colorado doctrine upon this subject was clarified by the recent decisions, and their authors do not distinguish between the case where the consumer has by deed acquired a permanent right, and that where his right has been only temporary and conferred by lease or license (as the later Colorado cases plainly do), and therefore the statements in their text books are clearly inaccurate."

Both Wiel and Kinney, as indicated in appellant's former brief, have said conclusively that in Colorado the consumer who takes water from a carrier ditch is the one in whom the title to the water right is vested, and clearly draw the distinction between the California and Colorado rules. Mr. Wiel made this statement in 1911, and Mr. Kinney in 1912, but counsel say that since these text books were written, the doctrine upon this subject has been clarified by recent decisions, referring to the Brown case and the case of People vs. District Court. Both Wiel and Kinney reviewed at length the decisions in Colorado and came to the same conclusion that the appellant in this case has come to, but let us refer to counsels' brief at page 278, where they say:

> "The argument in support of this contention is fallacious, rests upon no tangible foundation, is in conflict with the long line of Colorado decisions to which we have already referred, and is violative of fundamental principles enunciated by the Constitution of the State and the nation."

But if this long line of decisions in Colorado so emphatically sustain counsel's position, why was it necessary that the doctrine be clarified by the Brown case?

On pages 297 and 298 counsel ask some questions. They first ask the question as to who is the beneficial owner of the water right in Denver, and answer it by saying not the City, because it has been the ultimate consumer only to a limited extent, and not the private consumers, because they have not received and applied to a beneficial use all such water.

It is not important here whether the City or whether the inhabitants of the City are the beneficial owners of the water right. If the City is the owner of the whole water right, then it is the owner in a representative capacity for its inhabitants, but even admitting that the City is only the owner of the rights by it applied, is that any possible reason why there could not be other owners of water rights in the city? All carrier ditches have more than one consumer; they all have a large number of consumers. Some carrier ditch companies in Colorado have different municipalities as consumers, and also the inhabitants of each municipality as consumers.

Counsel ask if it be true that the beneficial ownership is to be ratably apportioned between the City and the private consumers, then who is such owner? The simple answer to this question is that the owner is the person that is consuming the water. But counsel say that the ultimate consumer may not be the same today as he was yesterday, or last month, or ten years ago, and ask in such case what would become of the beneficial ownership? The

plain answer to this is that when one person moves out of a house the next person moving in acquires the right to the use of water. The owner of a house and lot may have a water right the same as an owner of a farm may have a water right. The fact that there happens to be a large number of people in Denver and therefore a large number of changes, or discontinuances of use, in no manner changes the principle. This is upon the theory, however, that the inhabitants of Denver are acting for themselves. We are of the opinion that the status of the consumers is different in cities where the city authorities contract for them, than it is in the country, where each user contracts for himself. The city probably acts in a representative capacity for all of its inhabitants. But that question has never been decided by our Supreme Court, and it is immaterial anyway in this case.

On page 298 counsel make more inquiries. In one instance they ask the question—If a considerable number of Denver's inhabitants should prefer to live in a smaller town, and should thereupon move to a smaller town, and if they should announce that they had at another point diverted their water from the Platte River, and if appellant's theory be sound, who could say them nay? And again, if Denver should carry out its resolve, as evidenced by Section 264-A of the Charter, and should construct a new plant, if appellant's theory is sound, nothing could prevent the City from taking its vested water rights through the new system.

As to the first inquiry, whichever way it might be answered, would in no possible manner affect the issues involved in this case. But we will say that in-

sofar as the company is concerned, if any number of residents would move to a place outside of Denver served by this company's works, they would have the right to demand from the company water from its public carrier system, if there was water available for that purpose.

As to the next question, the City would have the right, in our judgment, although it is not involved in this case, to build a new system of its own and to take the water rights that it has acquired by user, and run the water through the system, but in doing this no doubt the company's water works system would thereby become diminished in value, and it might be argued that the company would be entitled to damages on account of the diminished value of its facilities of carriage but such damages would be measured not by the value of the water rights, because those they do not own, but by the diminished value of its structures, whatever that might be. If this were a purchase case this question might become important, but it is unnecessary to determine here what the company would be entitled to receive as compensation in the event of purchase.

As has been said, in a rate case where the title to the water is beyond all question in the consumer, as has been shown by the repeated announcements of the Colorado courts, and a fair rate of return has been allowed the carrier upon all of its facilities used in the carriage, upon what possible theory is the carrier entitled to any return upon the value of the property which the carrier is simply delivering to its owner? Must the owner, in paying compensation to his agent to deliver the owner's own water, be forced to take into consideration the value of the

owner's own property? It may be urged that the carrier has made large expenditures of money in facilities for carriage, and if the carrier is deprived of his right of carriage, these facilities would be materially reduced in value. This would be important if a proceeding to condemn the water alone was begun, and the water taken away, and the carrier was left with its facilities for carriage without anything to carry. But in a case where the facilities themselves are taken and paid for, or in a rate case as here, where a fair return is given on their value, what property right is the carrier company deprived of when the contract between the owner and carrier is terminated?

It certainly cannot be said that the owner shall be required to return to his agent any more than the agent has employed in the execution of his agency during the existence thereof.

We now come to the discussion of the case of the San Joaquin etc. Irr. Co. vs. County of Stanislaus, 233 U. S. 454, upon which counsel so confidently rely to sustain their contentions on this question of water rights. This case came up from California, and the water rights therein referred to were determined in accordance with the constitution, statutes and decisions of the Supreme Court of the State of California. We have heretofore referred to the differences, not only in the respective constitutions of the two states, but of the decisions of their courts of last resort. In California corporations or persons are given the right to appropriate water for sale. The water is devoted to a public use, the same as it is in Colorado, and therefore, subject to regulation by the state. It is subject to the same regulation that

railroads or other utilities, owning property rights are subject to, and the rule in regard to railroads or other public utilities is the same in Colorado as it is in California. Their property is devoted to a public use, nevertheless, it is privately owned property and owned for the benefit of the utility company; but water rights in Colorado are different. They are so different that they have been the subject of comment by all of the authorities writing on the subject. They have all pointed out the distinction between the rule in California and the rule in Colorado, and while it is perfectly proper in California to compare water appropriated for sale by a company to property owned by a railroad, the same analogy does not apply in Colorado.

Mr. Justice Holmes in the San Joaquin case, at page 460 of the opinion, in characterizing this water right of the company, refers to the constitution of California and states:

> "The declaration in the Constitution of 1879 that water appropriated for sale is appropriated to a public use must be taken according to its subject matter. The use is not by the public at large, like that of the ocean for sailing, but by certain individuals *for their private benefit* respectively. * * * The roadbed of a railroad is devoted to a public use in a stricter sense, yet the title of the railroad remains, and the use, though it may be demanded, must be paid for. * * * It is unreasonable to suppose that the constitutional declaration meant to compel a gift from the former owner to the

> users and that in dealing with water '*appropriated for sale*' is meant that there should be nothing to sell.". (Italics ours.)

But in Colorado the water is not appropriated for sale; it cannot be appropriated for sale, in fact it is not appropriated at all until the consumer applies it to a beneficial use. It has been repeatedly held in Colorado that water cannot be appropriated for sale, and the constitution and laws of the state have thereby been construed by the highest court of the state, and it is not open to question in a Federal Court.

The property of a railroad is compared by Mr. Justice Holmes with the property right acquired in water in California; but compare the property of a railroad in Colorado with that of a consumers' water right and see the marked distinction. The railroad owns its right of way, it owns its roadbed, it owns its rolling stock, not because the state has granted this property to it upon certain conditions, but because it has purchased it outright and owns it the same as any other person owns private property. It is subject to control, and must be devoted to a public use, but this does not affect the private ownership of the property.

What then is there of value in the hands of a water carrier in Colorado when the consumer has acquired the title to the water right? It might be said that inasmuch as the consumer is under obligations to the carrier to have his water brought through the carrier's ditch, and that the law of Colorado protects the carrier in this right, that therefore here is a property right which is of value, and should

be considered as an asset of the company for rate making purposes, but the master has not proceeded upon any such theory; neither have counsel proceeded upon such theory. There is no evidence in the record to support such a valuation. There is no legal basis whatever for such a valuation. This right that the carrier has to carry water through its ditch to a consumer is a reciprocal right. While the carrier, by virtue of the contract existing, and by virtue of the law in Colorado, has the right to carry such water and to receive a reasonable compensation therefor, the consumer has also the right to have the carrier transport the water to him. It is a case of mutual obligations and corresponding mutual benefit. If the carrier should say that the contract right to furnish this water to the consumer is of value, in addition to the rates, the consumer will offset it by saying that his taking of the water is of value to the carrier by enabling it to obtain compensation.

If A should enter into a contract with a railroad company to transport his goods from New York to Chicago, the railroad company would be entitled to a lawful rate for transporting the goods. The contract of the company would be a chose in action and would be of value, not only to the railroad company in the remuneration it would receive, but to the shipper, who would benefit by the transportation.

While we have not attempted to answer all of the various arguments of counsel with reference to this subject, or referred to all the cases cited by them, we have certainly pursued the subject as far as a proper consideration for the Court will justify.

There is only one further case cited by appellees that it is worth while to consider, and that is the case

of Gardner Water Company vs. Inhabitants of Gardner, 185 Mass. 190. This case is a valuable one in distinguishing the difference between the rule in California and the rule in Colorado. This was a water case and involved the purchase of the property of the Gardner Water Company, which had been furnishing water to the inhabitants of Gardner. The water rights involved in that case were the waters of Crystal Lake, together with the waters flowing into it.

This corporation, the Gardner Water Company, was organized by a state statute of 1882, Chapter 145, Section 9. It was organized for the purpose of furnishing water to the inhabitants of Gardner. By Section 2 of the statute it was authorized to take, haul and convey into and through the town of Gardner, or any part thereof, the water, so far as may be necessary for the purpose, of any spring or springs, or of Crystal Lake, so-called, etc. Section 3 of the statute provided that the company should, within sixty days after the taking of any land or water rights, file and cause to be recorded with the Register of Deeds of the County a description thereof, and that upon the filing of said instrument, "*the title of the land AND WATER RIGHTS so taken shall vest in said corporation.*"

It is readily seen, therefore, that by the terms of the grant of the state to the Water Company, the Water Company became the owner of the water rights, but being engaged in a public service, the company must devote such water rights to a public use, subject to the control of the state.

The character of the company's ownership is concisely and fully explained on page 194 of the opinion, where it is said:

"It is true that such ponds are held by the commonwealth for the benefit of the public, and it is not to be presumed that the legislature would attempt to make any disposition of their waters inconsistent with the interests of the public. In this case we have no nice question as to the power of the legislature to grant such property to an individual *solely for a private use*, for the grant to the petitioner was for an important public use. Of the power of the legislature to give to a private corporation, as well as to a city or town, water rights in a great pond, to be used in supplying inhabitants with water, there can be no doubt. This power has been exercised many times in Massachusetts. The rights and privileges of this corporation in the water, under the charter, *are similar to the rights of a railroad company in the land taken for its roadbed.* Such land can be taken and held only for a public use; *but the corporation has a valuable right of property in it.* While the primary object in taking and holding it is the public benefit, which alone justifies a taking without the consent of the owner, an incidental object is the hope of profit to be derived by the corporation from the use of it. In this respect the title of the present petitioner in the use of the water does not differ materially from the *title to the roadbed of a railroad acquired under the right of eminent domain.*" (Italics ours.)

The foregoing case, as well as the Newburyport Water Co. vs. City, 168 Mass. 541, and Gloucester Water Supply Co. vs. Gloucester, 179 Mass. 165, are merely declaratory of the principle that when property that a state has the right to grant has been granted to a company for the public use, while it is granted conditioned upon being employed for a public use, and while also it is subject to the police power of the state in regulating it, nevertheless the grant carries with it a private right, a private ownership which the grantee may enjoy, subject to the limitation of the police power of the state, and such also is the character of the grant by the California Constitution of the right to appropriate water for sale, rental or other disposition, but Colorado, as we have frequently pointed out, has not surrendered its sovereignty as to water, but still controls it, and most of the Western states, following the example of Colorado, have now adopted the same rule, and even California, though reluctant to adopt the principle, in 1911 passed a statute declaring the waters of the state *to be the property of the state*. Of course this statute in California would not affect vested rights, but from now on, or rather, from 1911 on, the rule in California will be the same as it has been here since the adoption of the constitution in Colorado, and the state will retain its sovereignty in the water, and all that can be hereafter acquired will be the right to the use of it. Western states that have now fallen in line with this rule, first adopted by Colorado, are: Arizona, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, Wyoming, and the last adherent, California. Wiel on Water Rights, Third Edition, Section 170.

We again assert with confidence that in Colorado water rights, which have been acquired by the application thereof to a beneficial use by a consumer, and where the diversion is effected through the instrumentality of a carrier, become incorporeal hereditaments; as they have been designated by our courts; these rights descend to our heirs when we die; are freehold estates of inheritance; and are owned by the person who has, under the constitution, enhanced the wealth of the state by the enrichment of the soil of the state. This doctrine in no manner infringes or violates the rights of the carrier. The carrier, when the question of rates is to be determined, is to be compensated for the money it has expended in the construction of its works in entering into this public employment. The water, however, has cost it nothing, and therefore, the taking it is not taking away anything that belonged to it, and the same rule would obtain in a purchase or condemnation case. The carrier company would be entitled to a reasonable remuneration for what it had expended in the construction of the works by it employed in furnishing water dedicated by the constitution to consumers, but the condemnation of its works without payment for water rights would not be taking its property for the reason that it never had any ownership in the water, but simply a right guaranteed it by the state to receive compensation for its carriage during the time that it acts as such carrier.

GOING CONCERN.

Appellee spends much time and extensive space urging that appellant's exceptions are insufficient. While admitting that there are three exceptions on the subject, appellee says they all go to the *amount* of the allowance and not to the *principle* of such an allowance. The three exceptions have been referred to and only partly quoted by appellee, but may be found in the record at page 1136. Besides covering all appellee admits they cover, Exception 17 specifically states that going value "ought not to be included in the determination of the present fair value of complainant's property for rate making purposes" This goes directly to the *principle* involved, and in addition to this, the exceptions are full, comprehensive, definite and specific. This objection of appellee is so captious, untenable and completely without foundation that it need not be noticed further. Appellant's original brief covered the subject so fully (pages 63-78) and demonstrated so completely that no specific allowance should be made for going value that further extended discussion seems hardly required. This Court has referred to and discussed it so often that the holdings of inferior courts, respecting same, scarcely need be referred to.

This Court has very aptly stated that "Each case must be controlled by its own circumstances." (Des Moines Gas Co. vs. Des Moines, 238 U. S. 153-165.)

The Master refers to the testimony of several of complainant's witnesses (Record p. 137), and then says:

> "My opinion is that the Company's witnesses assumed that too long a period and too great an expenditure of effort and money would be necessary to establish such a 'going concern' in such a city as Denver. There is no absolute standard by which the fair value of this element can be determined and I adopt $800,000.00, because no matter how often I have considered the evidence and the arguments, my mind always comes back to this amount as reasonable and fair to all parties."

The language he employs is substantially that of the special master in the Des Moines case; in fact, in his report he refers to this case (Record p. 137). As the Des Moines case is susceptible of different interpretations upon only a casual reading, it is evident that the special master misinterpreted that case. There the special master was first inclined to allow $300,000.00 for going value, but subsequently decided not to make the allowance, and his action was upheld by this Court. The master in that case made no separate allowance for "interest during construction" (see page 164 of the opinion), an item for which $805,000 was allowed in this case, and made no separate allowance for "going value," but allowed 15 per cent on the base value of the physical property, exclusive of real estate, as "overhead charges." The master in the Des Moines case, among other things, said on pages 166-167 of the opinion:

> "Such expenditures are termed overhead charges, and are as follows:

1. Time and money expended in the promotion of the enterprise, etc.

2. A competent engineer must be employed, etc.

3. The losses arising from accidents, injuries, etc.

4. Contingencies are such expenditures as arise from the lack of foresight, etc.

5. The cost of administration, which includes the time and money expended by the parties engaged in the enterprise, etc.

6. Interest during construction, etc.

7. Taxes during construction."

The latter the master regarded as very questionable.

Although no specific allowance for going value was made, this Court in commenting on the 15 per cent allowed for overhead charges, and in mentioning the seven items, said on page 171 of its opinion:

> "Overhead charges have been allowed for the items and in the sums already stated, it cannot be said, in view of the facts in this case, that the element of going value has not been given the consideration it deserves, and the appellant's contention in this behalf is not sustained."

Regardless of what interpretation may be put upon the language of the master in the present case, the facts are what control. And although this is not a case for allowance of going concern because of the monopolistic nature of the business and the prime

and legal necessity of the water furnished, nevertheless, if it were such a case the facts unmistakably show that this has been more than covered by the very liberal allowance for "engineering and contingencies," "interest during construction" and the large value placed upon the physical property for the purpose for which it is used, which far exceeds its value for any other purpose, a number of the witnesses having testified that its value for any other purpose would be several millions less (Record, pp. 207-231). Aside from the increased value allowed, there is allowed 20 per cent above this physical value for what 15 per cent covered in the Des Moines case, where the Court said upon such an allowance, "the going value had been sufficiently considered." But when it is remembered that instead of 15 per cent, covering all values above the physical value, that 32 per cent is the allowance in this case, the unreasonableness of such an allowance for going value strikes with added emphasis.

Indeed, according to the ruling in the Des Moines case, no extra allowance should have been made for "interest during construction," because this was included within the 15 per cent overhead charges there allowed. In other words, the 15 per cent covered all of the things therein enumerated, and included "interest during construction" and "going value." Here the master has added to the actual cost of reconstruction of the various items of the property, which must be reproduced, 12 per cent of the reproduction cost of the items, $1,046,272 as an allowance for "engineering and contingencies;" he has added $805,000 for "interest during construction;" and has added $800,000 for "going concern" value. This

makes a total of $2,651,272, which is practically 20 per cent of the total valuation (tangible and intangible) of $13,415,899, found by him as the entire valuation of the company's property.

It thus appears that practically one-fifth of this total valuation is something else than the physical valuation of the property of the company. Indeed, it is nearly one-third of the value of all of the property, such as in the Des Moines case was taken as the basis upon which the 15 per cent allowance for overhead charges was permitted. In the case at bar the structural value of the property was found by the master to be $8,378,167, and that is the contract price new for such structures. The $2,651,272 allowed by the master on the items included in the basis for the 15 per cent allowance mentioned in the Des Moines case is over 32 per cent of the structural cost of the properties to which such an allowance could, under the doctrine of the Des Moines case, be applicable. This is startling, and yet, if upon any state of facts which may be imagined, a 32 per cent allowance may be made, then what is to prevent a 50 per cent allowance being made on the same thing?

Appellant has urged that the master's estimate of the structural value is an estimate of its value in an assembled condition ready to go and ready to do business, and that the going value, if any, was absorbed wholly in any event by the items of "engineering and contingencies" and "interest during construction."

In Omaha vs. Omaha Water Co., 218 U. S. 203, this Court has recognized that there is a distinction in rate making and purchase cases, and referring to

the Knoxville case, 212 U. S. 1, and the Wilcox case, 212 U. S. 19, this Court says:

> "Both cases were rate cases and did not concern the estimates of value under contracts of sale."

A "going concern" value is an indefinite, intangible, almost imaginary something which inheres in a plant or business proposition as an element of value. If it exists at all it must have some basis of fact, and it certainly ought to be possible to express in words just what is meant by the term and to state directly what elements compose it, for it seems entirely unreasonable that a separate, definite and fixed sum of money should be placed on something which cannot be accurately described.

The sound and practical utterance of the Court in the case of Brunswick Water Dist. vs. Maine Water Works Co., 99 Me. 371, appeals to one's sense of reason where it is said:

> "The going concern part of it has no existence except as a characteristic of the structure. If no structure, no going concern. If a structure in use, it is a structure whose value is affected by the fact that it is in use. There is only one value. It is the value of the structure as being used. That is all there is of it." (Page 376 of the opinion.)

Even the skillful witnesses who have testified for the appellee were not able to define definitely just what they meant by "going concern" value, although they were all quite willing to put on it a valuation of

more than a million dollars. The testimony of Mr. Metcalf, the expert witness employed by the complainant, upon whom the special master chiefly relied, among other things had this to say:

> "I have assumed the going value of this property to be $1,200,000. I believe that the actual development expense of this plant has been substantially more than that" (Record page 267),

and referring again to going value, said on page 290 of the record:

> "The cost of establishing the business is one of the criteria of going value or development expense. The cost of reproducing that business is another. Personally I believe that the cost of reproducing the business is the safer criterion of value in the older plant. * * * I have no knowledge of the cost to the D. U. W. Co. of establishing its business. *It cannot be determined except on assumptions.*"

Witness Holman also states that going value includes the cost of developing the business.

In the Wilcox case, 212 U. S. 19, the allowance was made for practically the same, if not the same, element of value as allowed in this case, and the Court termed it "good will" on the theory that the business was of such a nature that people must deal with the public utility then under consideration, which had a practical monopoly. If it was "good will" in that case where the public utility had a practical monopoly, why not "good will" in this case where the public utility has an absolute monopoly?

Cost of developing the business of the appellee has not been shown by any testimony whatever except as it is presented by the expert witnesses in the case, who frankly say that they have no actual facts upon which to base any definite conclusion in this regard, and to use the language of Mr. Metcalf: "It cannot be determined except on assumptions."

Another fact to be taken into consideration why there should be no separate allowance for "going concern" is that this being a rate case, the business of the company is what is being regulated and the business is what is said to give a going value. The value of the going business depends on the rates, and these are the subject of regulation in this case. (Spring Valley Water Co. vs. San Francisco, 165 Fed. 657-695.) In fact, Mr. Metcalf states (Record, page 283):

> "It is partially true that the computations of going concern value are based upon the return under rates in effect here predicated upon the assumed value of water rights,"

and this Court in the Des Moines case, having the same point in mind, said, on page 171 of the opinion:

> "As pointed out in the *Cedar Rapids case*, if return is to be regarded beyond that compensation which a public service corporation is entitled to earn upon the fair value of its property, the right to regulate is of no moment, and income to which the corporation is not entitled would become the basis of valuation in determining the rights of the public."

As has been said, the facts are what must control; but, according to the master, the plant has already been valued as assembled, ready to do business. There is no competing plant; the business is here; the product to be furnished is an absolute necessity, and all must have it to live. For sanitary reasons the law of the City enjoins its use. According to the testimony, the consumers pay the cost of connections and own the corporation cocks. Every property owner is standing waiting impatiently to draw that he and his family may live. In an arid land the people are anxiously awaiting for some one to smite the rock in Horeb that the water may flow out. The people must also connect with the water mains in order to comply with the law. Then if, as the Master says, going concern is the cost of getting the business and building it up, how does it amount to $800,000? He says that he does not know, that he has no means of computation in making the allowance. Mr. Metcalf, whose testimony furnishes him his chief support, says that it is a matter of assumption, but the fact remains that it is $20.00 per connection for each of the 40,000 connections made in the city. If it is anything else it has been paid for. Everything else within the scope of an imaginative mental vision has been allowed for. If there were a competing plant there might be some cost in acquiring the business. If the product were not an absolute necessity and the Water Company had not at present a monopoly in furnishing it, there might be some cost of acquiring the business. As it is, the people must patronize the Water Company; there is no alternative; there is no cost of building it up. The plant has been valued in its assembled condition as an entity, ap-

proximately 20 per cent for overhead charges (including interest during construction) has been allowed, and if allowable at all, as was stated by this Court in the Des Moines case (page 171 of the opinion),

> "When overhead charges have been allowed for the items and in the sums already stated, it cannot be said, in view of the *facts* in this case, that the element of going value has not been given the consideration it deserves" (italics ours),

the item of $800,000 for going concern should unquestionably be eliminated from the rating base.

FAIR VALUE.

Under this topic we will discuss the matters contained in appellee's brief at pages 185 to 226, and pages 391 to 426. The matters contained at said pages all bear directly or incidentally on "fair value." There is no disputing the fact that complainant's case was not only prepared, but tried with great care and detail. But it is also true that their evidence as to value was based almost entirely on testimony of expert witnesses, these witnesses basing their statements upon the data included in Exhibit "C" and the report of the appraisers that had been appointed in 1907. Three of these appraisers, namely, Holman, Freeman and Hazen, testified in behalf of the complainant. Each of them predicated their various estimates on the conclusions that they arrived at in making these appraisements and upon the data contained in Exhibit "C." In so far as these three appraisers' testimony is concerned, the

only information that they could have upon which to predicate an opinion was their personal investigation of the subject matter. The fact that certain appraisers several years before had arrived at a conclusion certainly should not have been considered in basing a judgment on facts. Furthermore, it is not shown that the property included in the appraisement was the same property that the Master used in arriving at his rating base, and the facts upon which they arrived at their conclusion were not sufficiently shown to have justified the result of this appraisement.

Exhibit "C," referred to, was, of course, the principal data upon which the expert witnesses predicated their opinions as to the valuation of the company's property. This Exhibit "C" was not prepared by the witnesses who testified. It was prepared under the direction of complainant's principal witness, Leonard Metcalf. The surveys, examinations, drawings, tabulations, etc., were made by twenty or thirty engineers acting under the direction of Mr. Metcalf and his partner, William T. Barnes, of Chicago (Record, page 259). Mr. Metcalf states that the work was done in collaboration with Mr. George G. Anderson, who furnished the data for the water rights.

Exhibit "C" had been prepared and printed at least two months before the ordinance in question was passed. It was not prepared for the purpose of being used as an exhibit in the rate case, but evidently prepared as a prospectus to be used in a contemplated sale of the company's property either to the City of Denver or other purchasers. The exhibit is

an attractive statistical atlas of the company's property. It contains many beautiful pictures and is gotten up like the usual prospectus used for the purpose of inducing purchasers to buy.

Exhibit "C" was apparently accepted by the Master as establishing the facts that it purported to state, and was used by him as the basis of his findings as to value. But, notwithstanding the fact that all of the witnesses used Exhibit "C" as their basis of their estimates, there was a variance between the witnesses for the complainant from $15,370,000.00 to $16,614,917.00 (Record, page 138). The Master, however, in his finding No. 48 states that he has excluded from consideration a portion of the property included in the estimates of these witnesses. What the value of this excluded property was the Master does not find. He does in his finding No. 21 (Record, page 127) refer to certain tracts of land which were excluded by him as not being useful, but as to what other property he might have excluded it does not appear. It therefore follows that the report of the appraisers heretofore referred to is too indefinite and insufficient to be made the basis of a valuation, even though it was proper evidence to be considered.

The witness Gaffy, produced by the defendant below, found the gross reproduction cost of the structures to be $10,109,789.00. This is referred to in appellee's brief at pages 214-216. And the reproduction cost is estimated by defendant's witness, Bickel, as $9,915,388.00. Both Mr. Gaffy and Mr. Bickel included overhead charges in their estimates, such estimates being as to what it would cost to reproduce the plant. Neither of these, however, included the items of lands, water rights, going value, or supplies on

hand; and, of course, the lands and the value of the purchased water rights should have been included, but not the water rights that have not been purchased by the company. The item of "going value" or "going concern" was included in the overhead charges. The item of "supplies on hand" of $190,000.00 was not included, and should not have been included. It is no doubt true that it is necessary for the company to have on hand a large amount of supplies for the purpose of the proper maintenance of its plant, but these supplies are paid for as a part of the operating expenses, and having been charged to operating expense, should not be included as a part of the physical property of the company.

Counsel on page 216 of their brief tabulate the findings of the witnesses Gaffy and Bickel, and make a very plausible showing that these witnesses valuations were not far from the valuation found by the Master. But it must be taken into consideration that both these witnesses used the same rating base and the same property used by the other witnesses except the water rights and lands. And there was property that was excluded by the Master in arriving at his conclusion that was included by these two witnesses in arriving at their estimate of the value of the property.

Appellant stated in its former brief that there was a variation in the valuations of the various witnesses of from $4,000,000.00 to $5,000,000.00. This may have been slightly exaggerated. However, there is a variation between the witness Holman and the witness Bickel, of more than three and a half million dollars, and there is a variation between the Mas-

ter's valuation and the highest witness of appellee of $3,198,820.00 (Record, page 138).

Rating Base.

The foregoing discussion has been predicated upon taking the cost of reproduction less accrued depreciation as the basis for arriving at the fair value of the property, and we agree with counsel that this method is one of the most frequent methods employed in arriving at fair value. However, there are cases where this basis would afford but little aid in arriving at what the fair value of the property was, and appellant contends that *this case* is one of them.

What is the value of the company's property? Its physical structures and lands of course have some physical value, but its principal value has been by reason of the fact that it had a contract with Denver by which it supplied the means of furnishing water to Denver. But outside of this contract, and outside of its privilege of continuing to furnish water to Denver since its contract has expired, its property is of comparatively little value.

The witness, Freeman, testified at page 205 of the record:

> "I believe that the construction of such a plant by the city would depreciate the present plant at least $10,000,000. I did not take that into consideration in determining the present fair value of the property. I presume that the city can build its own plant if it wants to, but I believe that it is impossible to do so at the price stated."

And again at page 207:

> "I made the statement that the functional depreciation in this plant due to the construction of a new plant by the city would be about $10,000,000.00 as an approximation. This would leave a junk value on the basis of my figures of approximately $5,370,000.00, consisting of lands, *water rights*, large pipes not under expensive pavement, pumping engines, etc. I had given the matter consideration before I went on the witness stand."

Mr. Hazen at page 231 of the record, testified:

> "I believe a conservative estimate of that salvage value is from $5,000,000 to $6,000,000, and that the reduction in value of the present plant and property in that time would be from $9,000,000 to $10,000,000. In order to offset that loss accruing to the Company by reason of its being *obliged* to continue in the business, it would be necessary to increase the rates fully $1,000,000 a year in addition to the normal depreciation allowed."

Both of these witnesses included the value of the water rights in these salvage charges; and assuming their statements to be true and excluding $2,000,000.00 for water rights, the salvage value of the property would not be to exceed between $3,000,000 and $4,000,000. The witness, Hazen, speaks of the Company as being "obliged" to continue in business. When it is admitted that what the Company

owns after it ceases to do business in Denver is not to exceed $4,000,000, and upon this basis the Company is receiving a net rate of return of at least 15 per cent, it can readily be imagined that much compulsion is not necessary to cause the Company to continue to do business. The fact that the Company is still furnishing water to Denver and that it may continue to furnish it for some time adds nothing but a speculative value to the salvage value of its property. It is a tenant at will or by sufference, and as to how long it will continue to have a monopoly in Denver is purely conjectural.

The appellee indulges in severe criticism of the attitude of appellant's brief regarding a situation for which the appellants are in no wise responsible, i. e., the actual diminution of the value of the Water Company's plant, by reason of the fact that it now has no franchise and is an occupant of the streets of Denver merely by sufferance. In presenting what we said on this point in our opening brief, we called attention to a situation which we characterized as inevitable as death, and by this expression we referred to the inevitable expiration of the franchise which ought to have been in contemplation of all parties interested in it, not only in 1910, the date of its expiration, but at every minute of time during its existence. We have insisted that some provisions should have been made by setting aside a sinking fund or some other method for amortization which should meet this very condition, and we repeat and insist that wise business management would have prompted that course instead of the course of dispensing the revenues of the Company in the payment of extravagant expenditures in sal-

aries, executive expenses and in other directions which have already been noted.

The City ought not to be called upon to make good the future losses which may come to the Water Company by reason of the failure of the City to use the Water Company's plant, in case it shall decide to use other means to supply itself and its inhabitants with water. The Company's loss in that direction has already accrued by loss of the franchise, and if such loss exists, it is something that ought to have been cared for by the Water Company during the twenty years of its franchise life; it ought not to be saddled on the City now that the Company is here merely on sufferance.

In our opening brief we intended to say, and we think we did say, emphatically, that Denver had a right and is under the duty to deal with the Water Company, not generously, but fairly, giving to it what it is entitled to, but nothing more. Denver has not been the guardian of the Water Company's conscience or of its business or property or of its affairs, and now that the Company finds itself in a position for which the City is in nowise responsible, it rather than the City, should suffer the consequences of that condition.

The appellee devotes considerable space to the discussion of the word "value" and in one place makes the extraordinary statement that the word value means "just compensation." In another place a refinement of distinction is sought to be made between "exchange value" and "fair value" and we are asked, "would a dollar be worth one hundred cents if the dollar was in the pocket of a man who was being held up?"

There is only one definition of value, so far as we are able to ascertain. Value is the exchange relation of things which may be exchanged. The fact that value is frequently, indeed usually, measured by money does not change this definition at all. If the value is not "fair value," it is not value at all. Value means what a thing is worth, and if it is not exchange value, it is not value at all, and while it is sometimes said that a thing may have a greater value to one person than to another, or may be more valuable in some circumstances than in others, these are not by any means exact statements. Certainly we are not far wrong, indeed we are not wrong at all, when we insist that the value to the Water Company of the property used and useful as a water system for the City of Denver is, in present circumstances, what the Water Company could get for it for some other use.

Answering the question regarding the value of a dollar in the pocket of a man held up by a highwayman, we would ask another, what is the value of a dollar in the pocket of a man cast on a desert island, or otherwise deprived of the opportunity to dispose of it for some other thing which in his estimation is, in view of his needs, of equal value?

At the risk of repetition, we insist that one element to be taken into account in determining the question of the value of this property is what can the Water Company do with it in case the City builds its own plant?

The assertions throughout appellee's brief that the ordinance in question was or may have been a step looking to the purchase by the City of the Water Company's plant at less than its value is totally un-

justifiable and entirely unworthy; it nowhere appears in the record in the cause; it has never been presented, or even suggested before and it has no place whatever in this discussion. Certainly if the City by such trickery and underhanded methods should make such an attempt the courts would know how to meet it and would meet it.

No one would contend, least of all the appellant here, that the Water Company should not have every advantage of the increased value of its property due it by fortuitous circumstances; indeed over and over again the appellee's counsel insist that the question of what is the amount originally invested has absolutely nothing to do with the determination of value; and yet in their brief filed here counsel go so far as to urge that the Water Company should be compensated for the cost of its plant and have interest on the money during the time a new plant might be under construction. This idea permeates the entire argument made by them. In other words, the Company is to have all the advantage, but it is not to take any chances. It is plainly too much to ask that the City pay the rates which it pays for water and protect the Water Company against every conceivable business vicissitude. The Water Company knew in 1894 what the rates allowed to its predecessors under the 1890 franchise were, it came into the situation freely, eagerly and enthusiastically and very shortly thereafter it reduced the rates allowed by that ordinance to those provided by the "leaflet schedule"; and now when the franchise has expired and when it has been told by this Court, as it has in the New York Trust Company case, that it can neither compel the City to grant it a new franchise,

nor prevent the City from building its own plant, it seeks to crowd the City into a corner and to compel the City to reimburse it for the very things which ordinary business prudence would have bidden it provide for itself; for by the method of depreciation estimate followed by the Special Master it would compel the City now to provide the very depreciation fund which it itself ought to have set aside during the twenty years of its franchise; and in addition thereto it insists on very large remuneration for the services which it actually performs.

This case presents anomalous features; indeed we have not been able to find any case at all like it, and certainly no case closely resembling it has been cited by the appellee. The Company apparently had no records from which the actual investment could be determined, the thing which the appellee from its citation of Doherty, et al, against The Toledo Railway, etc., (Appellee's brief, p. 422), seems to think should be the basis for rates. No one of the cases cited by appellee is one where a municipality had sought to establish rates for service of a public utility performing its service merely at sufferance. The City, having the right to exclude the Water Company from its streets, surely has some right to fix the terms upon which the Company shall continue to do business.

Without any justification from the record, the appellee has undertaken to relate to the Court a long story of alleged oppressions by the City and of entirely unwarranted attacks upon it as it has pursued its virtuous, exemplary and disinterested course toward Denver and its inhabitants. All these statements are gratuitous, they have no place here, they

are not warranted by the facts, but it may be well, since we are dealing with imaginings, to suggest that possibly there has been something in the course of the Water Company in its business which has not been altogether above reproach. It may be that it has sometimes sought to interfere unwarrantably in public affairs not connected with its own activities. There may have been a spirit of righteous indignation aroused among Denver's people, because of some acts on the Water Company's part. It is hardly conceivable that even a vivid imagination could determine that the body politic would pursue such a course of injustice and of outrageous oppression against a public utility corporation as is charged against Denver, unless there were, not only provocation, but complete justification, for hostility. But all this is, as we view it, not applicable here. We refer to it merely because of appellee's wanderings from the record and its excursions into the fields of fancy.

Purchased Water Rights.

Appellant has conceded that if water rights were purchased by the Water Company for the purpose of furnishing water to Denver, the Company would be entitled to a fair return on the money thus invested, even though it is claimed that the title to such water thereby vests in the City of Denver and its inhabitants. The reason for this is that it would be working an injustice to permit the Company to lay out and expend its money for the purpose of furnishing water to the City, and then not be allowed a return for the money thus expended. The Master in his report valued these purchased water rights

at $949,500.00, and if these water rights had cost the Company this amount, and there was evidence in the record to show it, and these purchased water rights were actually used in furnishing water to Denver, there would be no doubt as to the propriety of an allowance. But the evidence is so uncertain and indefinite as to these water rights that it is impossible from the record to arrive at any conclusion or estimate as to their value to Denver.

In valuing these purchased water rights, the Master valued them as a whole, making reference to items 1, 2, 3, 4, 5, 13, 14, 15, 16, 17 and 21 of Exhibit "C" (Record, page 130). Table 1 of Exhibit "C" enumerates these water rights and they are valued at $1,150,000.00.

The basis of the valuation by the Master was not as to what these water rights cost the company, but upon the basis of what these water rights would yield in acre feet per annum. The Master placed a value on these water rights of $55.00 per acre foot (Record, page 131). A large part of these purchased water rights were acquired by the purchase of farms, the owners of which owned the water rights in connection with such farms. Complainant's witness, Wall (Record, pages 241-3), enumerates these water rights and testifies as to the value of the farms with the water and without. This testimony was introduced by complainant for the purpose of showing the value of its lands segregated from the water, but it also shows what was paid for a number of these water rights.

Complainant's witness, George G. Anderson, enumerates in his evidence (Record, pages 305-11), the

yield of all the water rights, including Lake Cheesman, the Cherry Creek and Mississippi Galleries. These purchased water rights and others claimed by the Company he gives as a safe annual minimum yield approximately 110,000 acre feet. The Master in his report finds that 54,000 acre feet is a reasonable estimate of the available delivery of water from Lake Cheesman, and that 37,000 acre feet is a safe yield from these purchased water rights (Record, page 131). But the Master does not give the yield of the Cherry Creek and Mississippi Galleries and some other sources of supply. He bases his valuation of water rights on the yield in acre feet annually, finding that the valuation is $55.00 per acre foot. Notwithstanding the Company has included all these water rights in its rating base, and notwithstanding the Master has adopted the same rating base, it will be seen that it was not a proper base to adopt.

The Company has never furnished water to Denver in excess of 55,000 acre feet annually (Record, page 70). The water furnished between 1908 and 1913, according to complainant's own statement, is an average of 16,820,800,000 gallons, which is less than 52,000 acre feet annually. It will thus be seen that the Company has had a large surplus of water on hand, and has used these purchased water rights on its own lands for irrigation. The witness, Anderson, stated (Record, page 310):

> "The Platte Canon ranches were included in our valuation of $16,000,000. Through possession of these ranches the Company is at all times able to make full use of the water available under its water

rights, and protect itself against the claim of abandonment by non-use."

The witness, Freeman, (Record, page 199), says:

> "I do not believe that the Water Company has gone beyond the proper practice in acquiring and holding such property against future need."

It has never been necessary to use these purchased water rights in furnishing water to Denver. The Company evidently intended to hold them as an investment, and in the meantime use them for irrigating its own lands, and for the purpose of preventing any competing company from acquiring sufficient water to supply the City of Denver, and nothing should be allowed whatever for these purchased water rights in arriving at the rating base.

Cost of Producing a New System.

It hardly seems necessary to reply to the argument of appellee to the effect that a new system would cost Denver in excess of the amount found by the master as the fair value of the company's property, but even if it were possible to consider this as having any bearing on this case, the evidence in the record is too meagre to lay any foundation for the cost of the same.

The testimony of the witness Freeman with reference to the building of a new plant is as follows:

> "I presume that the City can build its own plant if it wants to, but I believe it is impossible to do so at the price stated." (Record, p. 205.)

(The price referred to by Freeman being his valuation of the appellee's water plant, which he placed at $15,380,000.)

The only other reference made by counsel to support this contention is to the report of the engineers, who made an estimate of the cost of a complete new water system to the Public Utilities Commission (Record, p. 73), the same being an allegation in complainant's bill. It must be remembered, however, that this report of these engineers was rejected by the Public Utilities Commission as being too high. The total cost as fixed by these engineers was $12,750,000, which included also a hydro-electric plant and a new distributing system for Denver; but this report of the engineers, like the report of the appraisers of 1907, is not proper evidence in this case, and should not be seriously considered. It is not shown what knowledge either the appraisers or the engineers had of the property of the company or of its value, and furthermore, it is not shown what property was included in arriving at the final valuation.

The engineers, according to complainant's allegations, also considered bringing water from the other side of the Continental Divide or from Utah, or some other distant point. Denver would not have to go away from its own tributary water shed to secure an abundant supply of water and at a reasonable price. There is enough water impounded in Lake Cheesman to supply Denver's wants for years yet to come. The water rights in Lake Cheesman belong to the City and its inhabitants. They are already the proprietors of these rights, and all that would have to be done in order to supply Denver

amply with water would be to either purchase or condemn Lake Cheesman and convey its waters to Denver through a modernly constructed aqueduct. Furthermore, Denver has title in its own right to other water rights that could be utilized if the City should grow beyond present expectations.

The value of Lake Cheesman, as found by the master's report, independent of the water rights, is $1,089,225, and allowing $4,000,000 for an efficient distributing system and $2,500,000 for conduits, would leave the City a margin after selling its $8,000,000 of bonds which already have been authorized for the purchase or construction of a system, and there would be no impediments in the way of the City accomplishing this purpose and in the manner pointed out. It has the right to procure by condemnation Lake Cheesman or any of the other units of the company that it needs in the assembling of a municipal water plant, and the price that it would have to pay for those units is the reasonable market value of the units; and to say that Denver would have to expend $20,000,000.00 or anywhere near such sum to provide itself with a practical and efficient plant, or that it would have to go across the Continental Divide to procure its supply of water is purely imaginary.

Appellee at pages 408-9 of its brief refers to an alleged investigation that was concluded December 14, 1916, almost two years after the decision of the District Court from which this appeal was taken, and almost three years after the rate ordinance herein involved was passed. Inasmuch as the master or the court below could not have had any knowledge of what occurred after their decisions were rendered,

counsel must assume that this Court will take judicial notice of this startling contribution.

The investigation referred to purports to have been made at the instance of the Public Utilities Commission by an *impartial* and *thoroughly competent* firm of engineers. The identity of the members composing this firm is not disclosed, neither are we told of their residence, except that they were non-residents. It is admitted, however, by appellee that they made a careful, comprehensive and complete investigation, and as a result found that in order for the City to build as efficient a plant as that of the Denver Union Water Company would require an expenditure of $27,470,498.57 (approximately). The impartiality of these thoroughly competent engineers was established by their recommendation "that the City and County of Denver should, instead of attempting to provide a new and duplicate system, acquire the property of the Denver Union Water Company under the terms of the option agreement dated February 21, 1916."

Even though we were not to question the facts as above established, nevertheless the so-called "facts" fail to show their relevancy. They do not show where this plant was to be constructed, the character of the same, or how large a plant was contemplated. Neither do they show from what state it was proposed to procure the water, or what mountain ranges would have to be tunneled to get the water to Denver. Indeed, it is not shown in what possible manner these so-called facts are at all material. Assuming these facts to be true, the only possible deduction that can be drawn from them is that these engineers recommended that the City purchase the

plant which the appellee is so desirous of selling at less than half of what the new plant could be constructed for.

Of course it is impossible to controvert this statement legitimately, as the evidence in the case has been closed more than two years. It is also impossible to influence this Court by making such statements. We feel that we really owe an apology to the Court for even discussing a matter so foreign to the cause. But such statements illustrate the character and unreliability of the evidence upon which the entire case of the appellee is based. The principal facts involved in this case were attempted to be established by complainant below upon so-called evidence of expert witnesses based upon either estimates or fiction, and we again submit that the evidence was not of that clearness and accuracy that is demanded when it is sought to set aside the acts of a rate making body by judicial interference.

CONCLUSION.

In view of the actually existing conditions, the ordinance complained of is not confiscatory; it does not and cannot deprive the Water Company of a fair return upon the reasonable value of its property; it provides a revenue for the company which is entirely adequate for the use of every single item of the company's property used and useful in the Water Company's business in furnishing water to Denver.

The ordinance and the rates under it certainly should be submitted to a test.

The injunction ought not to continue in force.

The decision of the District Court should be reversed.

Respectfully submitted,

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